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CITY COUNTY STATE

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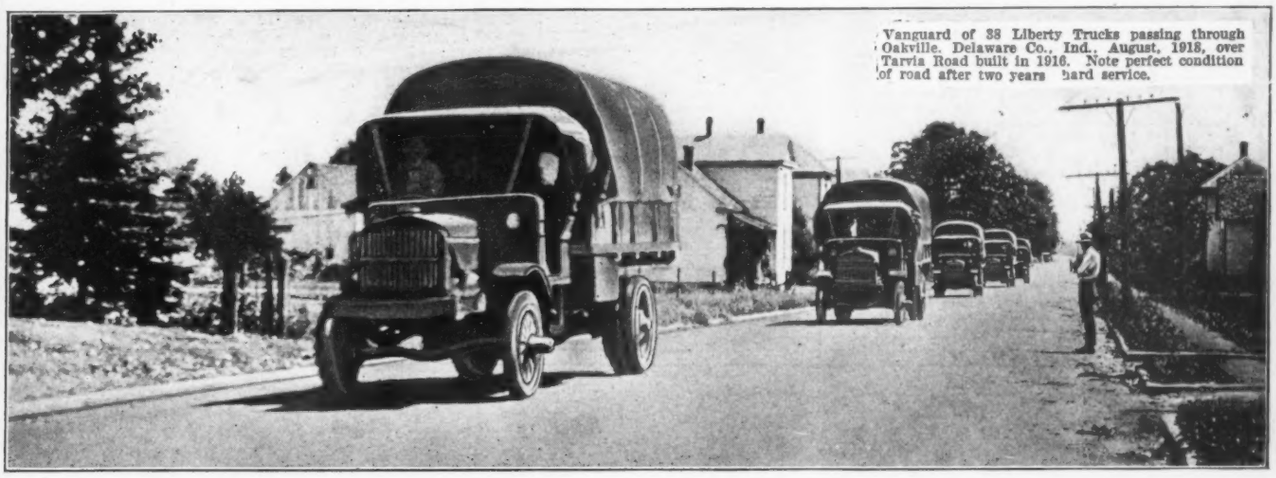

Vanguard of 38 Liberty Trucks passing through Oakville, Delaware Co., Ind., August, 1918, over Tarvia Road built in 1916. Note perfect condition of road after two years hard service.

Municipal Journal & Public Works.

City County State

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Contributed Articles and Reports.

Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send to Municipal Journal and Public Works regularly their annual and special reports.

Information Bureau.

The Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

Contents of This Issue.

THE WATER WORKS CONVENTION.

To its thirteen hundred members the annual convention of the American Water Works Association is a most important event, as the opportunity of the year for meeting with others whose ideas and problems are the same, for keeping up to date in their knowledge of the progress made in the water works field, and for receiving new inspiration for high-grade professional work.

But many are unable to attend every convention. At last week's convention only about twenty per cent of the active members were in attendance. The other eighty per cent must obtain their share of the benefit through reading accounts of the proceedings, the papers and discussions. This is far less profitable than first-hand acquiring of the information, while the benefit of personal contact is missing; but it is much better than nothing. For the benefit of the absent eighty per cent (and of the many more who are not members) we are publishing this week (to be concluded next) a description of the meetings of the convention which we believe will be found to give as complete knowledge of what was said and done as could be conveyed by anything less than the full minutes of the convention. Owing to its importance to all water works men we offer no apologies for the space in this issue devoted to it.

MUNICIPAL OWNERSHIP OF WATER WORKS.

"Public ownership is less attractive to the people in the light of recent experience in public administration of public utilities in construction work—of the Shipping Board, the Housing Bureau, the Railroads, the construction and other divisions of the army at home and abroad—and of the advance in prices of labor and materials. The condition and service of the railroads and of the electric traction properties are far from satisfactory and their present financial problems seem almost insolvable. Many of the great water works systems are in difficult positions financially. The Government itself, as evidenced by the utterances of Mr. McAdoo, Mr. Hines, and many others, has recognized the decline in morale under Government ownership. The attitude of the great daily papers the country over, in text and editorials, appears overwhelmingly opposed to its extension. Even the utterances of the Church, through Cardinal Gibbons, reflect the same view."

Such is the opinion of one of the most prominent engineers of the country, who is accustomed to taking broad views of questions in which public utilities are involved, and not the strictly engineering side alone. And this opinion was expressed in a paper before the national water works association, in spite of the fact that no

other public utilities have been owned and operated more generally or more successfully by municipalities than have water works.

Whether an opinion adverse to municipal ownership of water works should be deduced from federal ownership of entirely different types of utilities during the unusual conditions of the past two years is open to debate and will, we believe, be answered in the negative by many officials of municipal water works plants. It is quite possible, however, that experiences of the past two years will, as Mr. Metcalf suggests, prejudice taxpayers generally against all municipal ownership of any kind of utility, in spite of the long and favorable showing made by municipally-owned water works.

AMERICAN WATER WORKS CONVENTION

Doings of the Thirty-ninth Convention of the American Water Works Association—Business Transacted, Reports of Committees, Papers and Discussions, and "Round Table" and "Question Box" Exchanges of Experiences.

The 39th annual convention of the American Waterworks Association was held in Buffalo last week, the first session being held on the morning of June 10th, and the last on the morning of Friday, June 13th. However, the latter was an informal session, all business of the association being terminated with the morning session of Thursday, June 12th. The final list of members registered showed 278 active members present, 201 associate members and a considerable number of guests.

The number of papers read was smaller than usual, but this was more than compensated by the exceptional character of most of them, and by the amount of general discussion that took place at most of the sessions. There was little important business transacted at the convention other than the regular nominating of members of the nominating committee, announcement of the result of the letter ballot for the election of officers, and selection of the next place of meeting. The officers elected for the following year were: President, Carleton E. Davis, chief of the Bureau of Water, of Philadelphia; vice president, M. L. Worrell, general manager of the water department of Meridian, Miss.; treasurer, James M. Caird, (re-elected); and trustees, W. H. Randall, superintendent of maintenance of the Toronto waterworks, and F. C. Jordan, secretary of the Indianapolis Water Company. Montreal was selected as the place for the next annual convention, (possibly because personal liberty there will not be affected by the prohibition amendment). The nominees for the Nominating Committee selected by the several districts were as follows: District No. 1, Frank A. Barbour and James H. Long; district No. 2, Lyman P. Hapgood; district No. 3, George C. Gensheimer; district No. 4, Henry B. Morgan and C. W. Wiles; district No. 5, Chester E. McFarland and F. T. Cutts; district No. 6, J. Chris Jensen and F. W. Cappelen.

AMENDMENTS TO THE CONSTITUTION.

On the recommendation of the executive committee, two amendments to the constitution were adopted, one amending section 3, article X, of the constitution so as to insure that officers of the several sections be limited to strictly active members, the section as revised reading: "Such sections which shall consist only of members of this association in good standing, shall elect their own officers and committees, subject to confirmation by the secretary of the association as to their standing in the association; and may make any rules for their government not inconsistent with the constitution and by-laws of the association, but these rules must first be approved by the executive committee."

The other amendment was an addition to section 1, and article V, as follows: "Provided that any active member in good standing who has paid dues continuously for thirty years shall be exempt from payment of further dues." It was explained that the latter amendment would at present apply to twenty-seven members.

In addition to proposing these amendments, the executive committee announced that the remission of dues of members in war service will be continued until demobilization is effected; and that all members who may be in arrears of dues on July 1st of each year be notified that their names will be taken off the mailing list of the Journal until such time as their dues are paid up.

MEMBERSHIP.

The secretary, in his annual report, stated that during the year ending April 1st 72 active members had been elected, and 12 had been restored by paying back dues, while 47 had resigned, 13 died, 65 had been dropped for non-payment of dues, one had been dropped because an enemy alien, and three had been transferred to corporate membership; giving a net loss for the year of 45. Corporate members had been increased by six elected, two restored by paying back dues, and three transferred from active membership, there being a net gain of nine during the year. Eight associate members were elected and nine were lost, a net loss of one. Two honorary members died during the year, leaving five. This gives a total membership as of April 1, 1919, of 1,241, a net loss of 39 from the year previous. Concerning this membership report, Secretary Diven announced that the loss was probably due to war conditions, and that since the first of April, the society had received about 70 applications for membership and had had about 11 resignations, giving a net gain during the past few weeks of 59, which would more than offset the loss for the year.

In connection with his report as chairman of the membership committee, Lewis I. Birdsall stated that the committee believed it would be desirable to establish a great number of new sections in order to reach water works men in the smaller cities who feel it impossible to attend national conventions, but who would probably come out to section meetings if sufficient number of these were scattered throughout the country. He stated that the American Chemical Society had a membership of 15,000 which is made up of local members in every state.

A number of other resolutions were adopted by the society in connection with reports of committees, which will be referred to in the description of the convention, which follows.

Tuesday Morning Session.

President Charles R. Henderson opened the convention in the convention hall of the Hotel Iroquois, at 9.30 Tuesday morning, with 155 members present. Following the address of welcome by A. W. Kreinheder, commissioner of public works of Buffalo, and a reply by President Henderson, the business of the convention opened with the report of the canvassing committee on the election of officers, which has already been given. In a brief speech, president-elect Davis called attention to the fact that, by the method of voting for officials now

employed by the society, the cost of this election was something over $500, or nearly $1.50 for each vote cast.

EFFECT OF THE WAR.

One of the most important papers of the convention, and one calling forth a large amount of discussion was then read by Leonard Metcalf, entitled "The Effect of the War Period, 1914-1918, and Public Control Upon the Waterworks of the United States." This paper will be found elsewhere in this issue, except that the tables and diagrams with explanatory notes will be postponed until next week for lack of room. Lieut. Col. Dabney H. Maury expressed what was apparently a general opinion in saying that the facts brought out in this paper were of the greatest immediate importance to members of the association, and that it was desirable that copies of the paper be placed in their hands as soon as possible. The motion was carried that it be printed in pamphlet form and sent out as soon as possible. At a later session, however, this decision was reversed, in view of the expense, and the fact that the paper would be published in regular order in about two months. (Readers of Municipal Journal and Public Works, however, will be able to benefit by the paper at once.) In answer to a question, Mr. Metcalf stated that he believed that the figures of the plants given in the table were fairly characteristic of all plants throughout the country.

Increasing Rates. There was a discussion among the members of conditions throughout the country as to the raising of rates and the action of public utility commissions in permitting such increase. (Next week or the week following, we expect to publish data furnished by several hundred waterworks superintendents, stating whether and to what extent they have raised rates since before the war,) J. N. Chester stated that in Ohio the Public Service Commission has no jurisdiction where there is a contract between private companies and manufacturers, and that, therefore, in that state and under those conditions, private companies could not raise their rates. He also stated that the political situation may affect the success of an application for permission to increase rates in that, if the legislature is about to convene, and there are a number of bills under consideration whereby the functions of the commission may be changed, a rate increase is likely to be denied, whereas if the legislature has just adjourned, the prospect of increase is much better.

R. B. Howell, of Omaha, told of the unusual conditions in their plant by which the rates were reduced seven per cent. in 1917, and by an additional five per cent. on January 1, 1919. The municipality had taken over the plant in 1912, and the rate to 97 per cent. of the consumers had been reduced to 50 per cent. by 1918, in spite of which the plant had accumulated a reserve of $400,000. However, the increase in expense due to increased costs had amounted to about 30 per cent. and would have been larger but for improvements which they had made, one being the manufacture of its own filter alum, at a cost of sixty cents per hundred pounds, including interest on the plant and depreciation and cost of operation, whereas they had been asked to pay $1.27 in 1916 for a three-year contract. As the plant used about fifty cars a year, this alone saves them about $15,000 a year. Another saving is effected by providing pits in which they can store under water from 12,000 to 15,000 tons of coal, or about 60 per cent. of a year's supply. They are thus enabled to buy coal in any quantity and take advantage of low prices at any time. They have purchased about $470,000 worth of Liberty bonds.

Future Costs. J. W. Ledoux said he was particularly interested in Mr. Metcalf's prediction that wages would not be lowered, and might go higher, and thought that making such prediction was of doubtful expediency, especially since it could not be made with any certainty. N. S. Hill agreed with Mr. Ledoux, believing that the price of labor will stay substantially where it is, but that we should be extremely conservative both in predicting and in acting upon such beliefs. The prices of materials, he thought, would be reduced materially, but slowly, but urged that such belief be not used as an argument for deferring new construction. Especially should new construction be put through at once if it is necessary to maintain service, since he believed that the public wanted good service, and would much rather pay a little more for it than have its quality deteriorate. The charge for water cuts very little figure in the living economies of any person, and it is not likely to be considered in comparison with efficient service. From the municipal plant view-point, it is policy to give good service, and from the private plant viewpoint there is nothing in the world that maintains rates so well.

Municipal Ownership. Discussing the matter of municipal ownership, Mr. Howell said that one of its chief advantages is the lower interest rates and absence of profit that had to be provided. The electric light plant in Omaha, a short time ago, was found to be paying 11 per cent. on its investment, while the municipal waterworks plant was paying an interest of 4.4 per cent. on the capital invested in its plant. If the difference, or 6.6 per cent. be put in a savings bank each year at 4 per cent., at the end of thirty years, when the bonds are due, they would be able to pay off all the bonded indebtedness of the city of Omaha, Douglas county, in which it is located, the school district, and still have 23 million in the treasury. "Public ownership can win if it can have fair and just management; but when public ownership gives up all revenue from fire protection, and does not have fair return from everybody who receives service, that is where it fails." Omaha charges for all service rendered—fire hydrants and sprinklers, public fire protection, etc. Where mains are laid in a newly developed property, the owners of the property must pay for them at the rate of fifty cents a front foot on each side of the street.

DAMAGES TO FIRE HYDRANTS.

There was then a general discussion, called a "round table meeting" on the subject of "Damages to Fire Hydrants by Motor Vehicles and Remedies Therefor." The discussion was opened by Wm. W. Brush, deputy chief engineer of the New York Department of Water Supply, Gas and Electricity, who stated that during the past two years that city had had an average of about 400 hydrants a year destroyed by motor trucks, generally the larger three or five-ton trucks. This involves an annual expenditure of about $12,000 for repairs. At first they replaced the hydrants or scrapped the damaged parts, but for some time now they have been repairing the breaks by welding by the oxyacetylene process. Broken standpipes are welded in the municipal shop for about $6.00 each, including the entire labor and material cost, but not any overhead charges. To take out the standpipe, weld the break, and reassemble the hydrant, costs about $12.50. Welding done outside the shop would cost about $8 or $10. Other items, including cost of removing the hydrant and replacing the repaired one bring the total up to $20 or $25.

Mr. Brush concluded that, although the cost of making repairs was considerable, it would not pay to make any change in either type or location of hydrant in order to avoid it, since there are more than 40,000 hydrants to be changed, which would allow only 30 cents each. Even

if confined to the boroughs of Manhattan and the Bronx alone, where the traffic is heaviest, there are about 21,000 hydrants and the cost would be less than 60 cents per hydrant a year, which would not cover the cost of change in location or type.

In New York, with the breaking of the hydrant, the loss of water is negligible, the standpipe being broken at or above the surface and the valves of the pressure hydrants remaining closed. In some cities where hydrants are used that open with a little pressure, the breaking of hydrants has resulted in very serious troubles. Mr. Brush said that he had been told by Mr. McInnes that Boston recently changed its type of hydrants on account of the damage that followed the opening of hydrants by pressure. Mr. Brush said that it did not seem that any practicable thickness of the wall of the hydrant would lessen the number of damaged hydrants, but any hydrant would break when a heavy truck hit it. He also doubted whether any fenders or guards could be used that would effectively protect hydrants.

C. W. Wiles, of Delaware, Ohio, said that his city had found that it was cheaper to buy a new barrel and renew interchangeable parts than to weld. Mr. Brush, on the subject of cost, supplemented his figures by stating that the cost of removing a hydrant that did not have a flange at the ground surface would comprise $5.00 for caulker, $6.50 for two laborers, $3.00 for a Ford car and $4.80 for replacing 16 square feet of sidewalk; the greatest part of which cost would be elminated if a hydrant is used that has a flange at the sidewalk level.

Remedies Available. F. W. Cappelen, of Minneapolis, began a discussion of the other phase of the subject—the remedies available or methods of prevention possible. The records of his city show that only one hydrant has been broken that was not located at a street intersection and he therefore suggested that most of the breakage could be avoided by placing hydrants at the middle of the block rather than at the corner, or at least back a little distance from the corner. He had found that certain corners seemed exceptionally fatal to hydrants, there being several where hydrants were broken one after another, and other members reported having had the same experience in their cities.

Considering the four remedies that had been suggested —moving hydrants from the curb to the building line, substitution of flush hydrants for the post style, placing post fenders around hydrants, and repairing broken hydrants, Mr. Cappelen did not consider it good practice to set hydrants near buildings because of the inaccessibility of the hydrant should the building be on fire; the area-ways under the sidewalks in the business district would prevent this location, and hydrants so placed would be inaccessible to fire engines.

Flush hydrants might be practicable in warm climates, but it would be difficult to find them quickly under snow and ice; frozen covers would delay their use, and the inconvenience of connecting to them would make them unpopular with fire departments. Also the pit in which the hydrant is placed fills with water and slush and freezes solid in case of a winter fire of several hours' duration. Minneapolis had had about twenty-four such hydrants, but these had been replaced by post hydrants for the reasons stated. Moreover, the expense of changing to flush hydrants would be enormous, and if only part were changed there would result a confusion that might be serious in an emergency.

As to hydrant guards, Minneapolis had had hydrants broken off where six-inch pipes had been set in the ground to protect them. Guards or fenders which were effective would have to be so substantial as to be undesirable obstructions not only to traffic, but also to the firemen's use of the hydrants. They would also involve considerable expense.

In Minneapolis 43 hydrants had been broken during the past sixteen months and repaired at a cost of $14.40 for excavation, removal and resetting, $3.84 for shop work and assembling, $10.47 for welding by private parties, and $2.50 for cartage; a total cost of $31.21 average per hydrant. A hydrant without a jacket set in the ground will resist a considerable blow and in some cases a seven-inch post will be pushed over somewhat without breaking. He therefore suggests using hydrants with a large, strong barrel or post set firmly in the ground. Mr. Cappelen seemed, however, to favor chiefly the locating of hydrants a lot or two away from the intersection of the street lines, since the greater danger appeared to be at the corners, and such location of hydrants would still permit running hose lines from them down either street.

Mr. Brush, commenting on this, said that he did not know whether or not damages to hydrants in New York City had been altogether to corner ones. The present practice in New York is to set hydrants fifty feet away from the corner, which he believed lessened the danger from breakage by trucks. Richard Whitney, of Syracuse, reported that hydrant breakage had not occurred often enough in that city to be considered a serious problem, being considerably less than ten a year out of 4,000 hydrants. One particular hydrant has been broken three times in two years, being at the intersection of a wide and a narrow street, where a great volume of traffic turns from the wide to the narrow. All but two of the breakages, so far as they know, were caused by pleasure cars. One was caused by a truck driver who, when ascending a steep hill, found that the brakes would not hold nor the power carry him to the top and deliberately backed the truck into the hydrant to stop his downward progress. It is the intention in Syracuse in the future to study traffic conditions in placing new hydrants and to use for critical points a type of hydrant which has the least tendency to open when broken.

A. W. Cuddeback, of Paterson, N. J., said that the percentage of breakage there was about the same as in Brooklyn and about 50 per cent of the compression hydrants break off down near the valve. Mr. Chester did not believe that electric welding would be practicable for small communities where the number of broken hydrants in a year are few, warning officials of such cities to make careful calculation before deciding that welding would be cheaper than buying repair pipes. On the other hand, W. S. Cramer stated that in his town of 4,000 inhabitants 12 hydrants were broken last year and were repaired by the oxyacetylene process in a local machine shop at an average cost of $6.56 a piece.

Replying to a question as to whether the city paid for damages due to flooding by broken hydrants, Mr. Brush said that in New York State the party suffering the damage could not collect from the municipality provided the municipality has exercised promptness in shutting off the water from the broken part of the distribution system.

President Henderson asked the superintendents to indicate by a show of hands whether they made a general practice of setting a valve on the hydrant branch, the result being that most of them appeared to set valves in this way, and Mr. Wiles said that modern practice had demonstrated that every hydrant ought to have a shut-off valve, and he believed that all up-to-date plants were now using them for each hydrant.

Tuesday Afternoon Session.

The session opened with a short paper by John Knickerbocker entitled "Investigation of Question of Flanges for Light Cast-Iron Pipe," the purpose of the paper being to place before the society drawings and other information showing thickness of flange, diameter and spacing of bolt holes according to standards of the Am. Soc. of Mechanical Engineers and others, and to recommend an effort to obtain one common standard. The matter was referred to the standing committee on Revision of Standard Specifications for Cast-Iron Pipe and Specials.

The report of the committee on Private Fire Protection Services was then taken up and discussed at considerable length, the convention voting that "the committee be continued, with instructions to more thoroughly crystallize, from the discussion, its recommendations and again bring them before the association for adoption, either by letter ballot or at the next convention." The report has already been printed in a pamphlet of 58 pages and distributed to tht members.

(To be continued)

PRIVATE FIRE PROTECTION.

Report of Committee of American Water Works Association Giving Recommendations for Procedure in Installing and Charging for Private Fire Devices.

The committee on private fire protection service of the American Water Works Association consisted of Nicholas S. Hill, Jr., chairman, George G. Earl, Frank C. Jordan, Walter E. Miller and Maj. E. V. French. Owing to the absence of Maj. French in Europe he was not able to act with the others in the preparation of their report which was submitted to the convention on June 10. A very much condensed abstract of this report is given herewith, in which only the conclusions are presented, it being impracticable for us to give space for the various arguments pro and con in connection therewith.

The committee divided the more important questions under two heads, physical and fiscal, as follows:

A. *Physical*:

1. Shall water for domestic and manufacturing uses be furnished through the same service pipe with water for private fire protection equipment?
2. How shall the water purveyor be protected so as to prevent the intentional or unintentional use or waste of water through such connections?
3. How shall private fire service pipes be controlled where they enter buildings or private property so that in case of the breaking of the inside pipe, or of the service pipe, water may be shut off and bleeding of the water system prevented?
4. What limit should be placed upon the size of fire service connections?
5. What means shall be adopted to prevent the pollution of a public water supply through a private fire protection service when an independent water system is also connected with the fire protection system?

B. *Fiscal*:

6. By whom should the cost of installing the private fire protection service and accessories be borne?
7. Should a charge be made for private fire protection service?
8. How should the charge for private fire protection service be determined?

The following includes the more important elements of an ordinary private fire service equipment.

a. Automatic sprinklers.

b. Open sprinklers turned on by hand for the outside protection of cornices and windows.

c. Standpipes for hose in buildings.

d. Yard hydrants.

e. Connections for filling cisterns or tanks from which fire pumps draw, or direct connections to the suction connections to fire pumps.

f. Elevated tanks for the storage of a supply of water to be used for fire protection purposes only.

Answering question No. 1, the committee concludes that in general it is advisable to install separate fire service connections for all mills, factories, industrial plants, railroad terminals and the like and to insist upon separate connections for all classes of property unless it is feasible to install a meter which is as accurate as one designed for the registration of domestic or commercial consumption. It is inadvisable in any case to allow the combined use of a single service connection, when protected by fire service meters only or by other methods which are practical on service connections used for fire service alone. In no case should combined service connections be allowed for premises supplies from an independent water supply for fire protection.

Second Question.—Discussing question No. 2, the committee states that out of 521 replies to inquiries as to whether the different purveyors had discovered a loss of water through private fire connections, either through leaks or use of water, 236 testified to actual experience of the intentional and unintentional use or waste of water through unmetered fire connections.

As the installation of a meter adds nothing to the value of a service from the consumer's viewpoint, but adds to its cost, individuals, corporations and the underwriters have opposed the use of meters. Many of the ordinary types of domestic and commercial meters are objected to by the underwriters on the ground that the moving parts may become clogged and obstruct the flow of water. Some of the ordinary types of domestic and commercial meters create large friction losses when delivering the quantities necessary for fire protection service. Fish traps are also objected to because they may become clogged. Service meters designed especially for fire service connections have been developed which eliminate in large measure the objection raised to the ordinary domestic and commercial type of meter. Among such may be mentioned the Hersey Detector Meter sold by the Hersey Manufacturing Company, the Trident Protectus meter, manufactured by the Neptune Meter Company, and the Utility Meter furnished by the Pittsburgh Meter Company. These meters differ chiefly in details. In principle they are the same. They consist of a check valve in the main supply line, arranged with a by-pass on which a meter is installed to measure accurately all water passing through the by-pass around the check, together with another meter which measures the quantity of water which passes through the check valve when the valve is open.

Although these meters practically eliminate the danger of obstructing the flow, the underwriters have insisted upon the introduction of a by-pass around such meters so that water for fire service may be obtained when the meter is being examined, adjusted or repaired. The valve on the by-pass is sealed so that water may not be used ostensibly through the by-pass unless the seal is broken; but the installation of this by-pass results in the practical elimination of the security to be obtained from the installation of the meter as a preventative against the intentional use of water through private fire service connections in the absence of systematic and regular inspections. The committee sees no good reason for requiring such by-pass.

The committee is convinced that the great majority of waterworks superintendents favor such meters, but offers for consideration, where separate fire connections for fire protection only are installed, what it has termed the "bond-alarm-inspection system." Even when a meter is used, the device must be inspected at regular intervals, and the committee suggests that the applicant file a bond with the water purveyor conditioned upon the use of the fire service connection for fire protection only, to be forfeited in the event of violation of the rules; the amount of bond to be sufficient to deter the water-taker from running any risk in the matter. Instead of a detector meter, install an alarm valve equipped with a pressure recording the gauge and a small by-pass meter, such valve being a check-valve arranged with a clapper which, when raised a slight distance from its seat, opens a port by which an electric circuit is closed and an alarm bell rung. Usually the discharging of one sprinkler head is sufficient to open the port. An eight-day recording pressure gauge is connected with the port and arranged to register simultaneously with the ringing of the gong. The inspector of the water department would, during his weekly inspection, observe if and when check valve had opened during the previous week. A small 5/8-inch meter would be installed on a by-pass around the alarm valve to register small flows of less than twenty gallons per minute, which is sufficient to open the port. In addition, all yard hydrants, valves on hose outlets, on standpipes and other outlets connected with the sprinkler system, would be sealed and the seals inspected monthly. The alarm performs the important function of summoning help in case the sprinklers begin discharging at night or in places where no employes are present. The committee believes that either this system or a meter should be placed on all fire service connections.

Third Question.—The record of 20,000 or more fires indicates that in about five per cent of them automatic sprinklers do not hold the fire in check sufficiently to enable the blaze to be extinguished by outside fire-fighting agencies. If the sprinkler system fails, bleeding of water mains due to broken fire service connections or broken sprinkler equipment within buildings may result, causing enormous losses of water.

Where the building is located at a sufficient distance from the street, it is possible to provide adequate protection by installing a valve with indicator post at the building line or curb line. Where the building is close to the street, it may be necessary to place such valve across the street from the building and loop the service line across the street and back. It should be remembered, however, that during a large fire the heat may prevent access to the valve unless its distance from the burning building is considerable. It is always advisable as an additional precaution, where streets are narrow, to gate the street mains so that no more than a block, or a maximum of 500 feet, of mains need be shut in case the control valve be inaccessible.

The committee recommends the installation of valve with indicator post at the curb line where the buildings are some distance away, the looping across the street as suggested above where the building is close to the street and, in congested districts, securing the best possible location for such valve and in addition locating gates in the mains convenient for cutting out the main leading to the property.

Question No. 4.—The great majority of fires are controlled by the opening of not more than ten sprinkler heads, but there are many where fifty have opened; while in some the number which have opened is appreciably in excess of this. The discharge per sprinkler head is given by the committee as varying from twelve gallons per minute when the pressure on the head is five pounds, to fifty-eight gallons per minute when the pressure is one hundred pounds. The amount needed, however, cannot be measured definitely by the number of sprinklers to be supplied. More water will be needed in a plant having large undivided areas than in one which is more closely subdivided. In general it may be said that for small plants 500 to 750 gallons per minute will be satisfactory; for average-sized manufacturing properties, 750 to 1,000 gallons; while for large plants 1,000 to 1,500 gallons is desirable, and 2,000 gallons for very large ones. These figures would provide for hydrants and standpipes as well as sprinkler heads. These quantities are equivalent to from two to eight fire streams, and the discharge of this amount inside the plant might seriously interfere with the use of the fire-fighting apparatus on the outside. Consequently a supply stored in elevated tanks within the property should be secured wherever possible, in which case the fire service connection can be shut off when the fire-fighting apparatus arrives. The danger of this bleeding of the mains is so great that the water purveyor should in no case grant a private fire service the capacity of which exceeds 50 per cent of the capacity of the main supplying it.

Question No. 5.—The committee gave the opinions of the boards of health of several states on the subject of permitting cross-connections between fire supplies from the public system and private supplies from polluted sources. Needless to say, all such departments recognize the danger, but vary in the stringency of the measures which they endeavor to enforce to eliminate it. The double check-valve plan is in more or less common use, and one or two alternative plans are suggested by the committee. Their recommendation is summed up as follows: Where an independent supply is used for private fire protection, the fire service connection from the public mains should discharge into either a cistern or an elevated tank at or above the flow line and the protected property be required to take water for the fire protection equipment from the cistern or tank to preclude the possibility of back flow.

When such an arrangement is not possible, double check-valves should be installed with proper means for inspection and testing, as has been described previously before the society and in Municipal Journal and Public Works. These valves should be regularly and systematically inspected and reports filed as to their condition.

Question No. 6.—The committee believes that the water utility should pay the cost of installing the private fire service connection as far as the property line and that the charge for private fire service should be sufficient to cover interest, sinking fund charges and maintenance on the installation. Accessories, including control valves, check valves and alarm valve or meter, should be owned and controlled by the water utility and paid for by it, the rate being sufficient to include a fair allowance for repairs and maintenance and a reasonable return on the cost of the devices.

Question No. 7.—In this connection the committee discussed the decisions of public service commissions and of the courts, and concluded that "there is an apparent unanimity of opinion by courts and public utility commissions to the effect that a water utility which supplies water for private fire protection services performs a service which is in addition to supplying water for public fire protection, and the water utility has a right to make a reasonable charge for private fire protection service."

Question No. 8.—The committee outlines a method of

allocating charges, which is substantially the system adopted by the public utility commissions of New Jersey, Pennsylvania, Maryland, Wisconsin and possibly other states. It reviews the method of establishing rates for all classes of consumers, this process consisting first of determining how much money must be raised through rates and then proportioning the costs so as to raise this sum and place the burden in proportion to the service rendered. The steps in the establishing of a system of rates are then outlined, to the extent of several pages, on the general principle previously described several times by us that the charge should consist of two parts, one a fixed-service charge based upon the connection, and the other a proportional charge based upon the amount of water used. In the majority of cases the first or fixed-service charge would be the total charge for private fire protection service, "which will be the same as would be charged for any other connection of the same size, without distinction or discrimination on account of the purpose for which the connection is desired."

THE WAR AND THE WATER WORKS

The Effect of the War Period—1914 to 1918—and Public Control Upon the Water Works of the United States.

By LEONARD METCALF.*

Some months ago the executive committee of this association—the American Water Works Association—asked the writer to prepare for this convention a paper upon "financial control . . . and war-time rulings of public service commissions and capital issues committees on water works conditions, with references to such related subjects as deemed pertinent"; that, as suggested by President Henderson, there might be induced such discussions "as necessary to crystallize those results of war-time activities or stagnation which have affected water-works administration, to the end that managers may carry out the readjustment of their work to meet normal conditions in the best manner possible."

In response to this request, the speaker has reviewed five hundred decisions, more or less, affecting water works, handed down by courts and commissions during the four and one-half year period from January, 1915, to May, 1919, hoping to be able to report to the American Water Works Association their more salient points, or at least the present tendencies and the influences upon them of the war period. The task proved too big for the time available, and the speaker is therefore obliged to limit his comments to the impressions left by his investigation, rather than to attempt an exhaustive analysis of the decisions reviewed.

OWNERSHIP AND CONTROL.

Public Ownership is less attractive to the people in the light of recent experience in public administration of public utilities in construction work—of the Shipping Board, the Housing Bureau, the Railroads, the construction and other divisions of the army at home and abroad—and of the advance in prices of labor and materials. The condition and service of the railroads and of the electric traction properties are far from satisfactory, and their present financial problems seem almost insolvable. Many of the great water works systems are in difficult positions financially. The Government itself, as evidenced by the utterances of Mr. McAdoo, Mr. Hines and many others, has recognized the decline in morale under Government ownership. The attitude of the great daily papers, the country over, in text and editorials, appears overwhelmingly opposed to its extension. Even the utterances of the Church, through Cardinal Gibbons, reflect the same view.

The Jurisdiction of the Commissions in public utility regulation and control is constantly becoming more nearly complete. As the courts limit their action largely to questions of principle, reversals in the interpretation of fact by the commissions are rare. The practical effect of this, from the layman's viewpoint, is that, if the decision of the commission is sound in statement, there is little hope of modification of findings, even though the conclusions reached seem to indicate that no substantial weight was given to certain elements of value or factors affecting it.

Valuation. The commissions continue to tend strongly to original cost, as the fairest measure of value.

Many competent observers believe that past valuations or rating bases have frequently been too low, that the present decline in character or excellence of service clearly reflects this, and that the present rates on money are already, and the future rates will continue to be, higher in consequence of this tendency to undervalue. The difference between actual and assumed value may not always be great, but the tendency is to undervalue, and the influence is therefore usually in one direction. Its result appears likely to be disadvantageous to the public.

The failure of the rates prescribed by certain of the commissions in the past to yield the revenue intended gives further evidence that the companies are too often called upon to bear a burden of hazard of loss, which is disadvantageous to the public.

Overhead Allowances have increased substantially, indicating that the commissions themselves, as a result of longer experience, recognize that their earlier allowances were too close.

Going Value or Development Expense. While the recognition and inclusion of going value or development expense as a property element in the valuation of water works for purchase, sale, or rate determination, has been general and consistent on the part of the higher courts, the practice of some of the commissions appears in marked conflict to this position. The older commissions, however, generally recognize it, though the allowances for it are less than those accorded by financiers and operators in practice and in many actual sales.

Franchise Values per se have shrunk markedly in the past decade, by contrast with the previous decade.

Depreciation. The general treatment of the depreciation allowances has improved immensely, as evidence has accumulated, and this evidence has borne out the contentions of water works operators. The practice in the fixing of the annual depreciation allowance is generally fairer than in determining the accrued depreciation, but this difficulty is reduced by using the undepreciated value as the rating base.

The More Equitable Distribution of the Burden of the Rates is marked. The commissions have generally been steadfast in their insistence that the payment for fire protection service should be commensurate with its cost, and that the distribution as between domestic and commercial or industrial service should also be equitably distributed according to cost, within the limitation of loss of business resulting from raising its cost beyond that at which the industries could supply themselves.

The Position of the Public Service Commission has increased in power and recognition. Their ability and outlook has grown and broadened with experience. The good effect of continuity of service is as marked as is the retrogression due to change, until length of experience and service again make themselves felt.

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The mutual respect and cordial relations which exist between the commission and the corporation managers in many states, clearly reflect a better understanding of the real difficulties of the problem, and of a desire on both sides to reach workable standards of service, which shall be of common advantage to the public and to capital, to the operators and the employers of public utilities.

The most serious differences of opinion generally arise through lack of understanding or full appreciation of the fundamental factors and difficulties of the problem.

INCREASE IN CONSTRUCTION AND OPERATION COSTS.

The Marked Increase in Cost of Construction and Operation, which will be discussed in detail, is also reflected in the growing number of cases of advance in rates granted by the regulatory authorities.

A review of the water works decisions contained in the twenty-four volumes of Public Utilities Reports Annotated, published in the four years of 1915-1918, indicates the following approximate number of increases granted:

1915	.....	Increases granted to		4	plants
1916	.....	"	"	12	"
1917	.....	"	"	15	"
1918	.....	"	"	67	"

It is important to note that increases were few until the latter part of 1917, or early part of 1918, whereas the marked increase in cost of construction and operation to water works occurred in the latter part of 1916 or early part of 1917. This delay of 12 to 18 months was burdensome to the companies affected, more particularly to those with pumped supplies.

A reading of many of the decisions affecting water works and other public utilities, seems to indicate that it was the effort of the commissions to maintain the financial credit of the corporations, without attempting to make good the entire loss due to the war and abnormal conditions resulting.

THE FINANCIAL BURDENS DUE TO THE WAR WHERE BORNE BY THE WATER WORKS.

In its report to the last convention, the committee on "War Burdens of Water Works in the United States" called pointed attention to the letter of the Secretary of the United States Treasury, Mr. McAdoo, addressed to President Wilson, under date February 15, 1918, in which he said:

> I earnestly hope that you may feel justified in expressing the conviction that the vital part which the Public Utilities Companies represent in the life and war-making energy of the nation, ought to receive fair and just recognition by state and local authorities.

and to the reply of President Wilson, under date February 18, 1918:

> It is essential that these utilities should be maintained at their maximum efficiency, and that everything reasonably possible should be done with that end in view. I hope that the state and the local authorities, where they have not already done so, will, when the facts are properly laid before them, respond promptly to the necessities of the situation.

Reference was further made to the fact that the public service commissions and other regulatory bodies in the United States had already shown their appreciation of the serious nature of the conditions confronting the public utilities properties, by granting, in certain recent cases, increase in rates or levying surcharges on existing rate-schedules, after careful review of the local conditions.

The question may now fairly be asked: "Did the regulatory authorities meet the situation?"

The issue is not raised here as to whether they should or should not have met the situation, nor how far sound public policy demanded that rates should be raised to meet the burden of increased expenses, but merely the question of fact—did the commission relieve the public utilities of their increased burdens due to the war?

To this question the answer must be "No," though many substantial increases were granted.

Whatever may have been the theory, principle, or motive governing the action of the regulatory authorities, it is a fact that the relief granted did not cover the change in conditions. It is apparent in the decreased, or suspended, return upon traction, gas, telephone and water utilities. The burden of the tremendous increase in operating expenses, taxes, and cost of money was borne largely by the utilities themselves—by the investor and not by the public—for the time being, at least.

The data submitted herein seem to indicate that the increases granted to waterworks up to 1919 resulted in about a 10% increment in net revenue, and that in spite of this increase, there was a net decrease of approximately 10%.

The position of the regulatory authorities was a difficult one, in view of the abnormal condition of the times and the war needs. Opinion may well be divided as to the limit to which it was wise for the commissions to go in relieving the corporations of their burdensome increase in costs. To the writer it seemed, and has always seemed, that such burdens could not practically be removed by the commissions *promptly*, because this would require too frequent revision of rates, but that the burdens should be recognized and distributed over a somewhat longer period of time, through an increase in return giving adequate margin for their amortization, and for the establishment of reserves to cover the future hazard element.

The fact should be admitted, however, that the hazard of investment was *not* generally removed from the utilities by the regulatory authorities during the war, though relief was granted in many cases which helped to maintain the solvency of the corporations, and this was in some cases, at least, the goal sought.

EFFECT OF THE WAR UPON WATER WORKS REVENUES AND EXPENSES.

The situation with regard to the water works of the United States is probably fairly shown by the following† comparative records of about 50 plants with aggregate annual revenue of about $35,000,000, and supplying a total population of upwards of 9,000,000 persons, or nearly 9% of the entire population of the United States.

The records made available to this society at its last convention, through the efforts of the Committee on War Burdens of Water Works in the United States, and the courteous co-operation of the managers of these works, have been brought down to date, December 31, 1918, by the writer, through the further interest and assistance of these managers. The cost records which follow the revenue and expense records, will be further supplemented by Frank C. Jordan, secretary of the Indianapolis Water Company, who has made an independent investigation of this subject.

These records indicated that:

1. The annual revenues *with such increase in rate schedules as were granted by the regulatory authorities and put into effect by the plants,* have increased at an average rate of approximately 7% per annum, slightly less than a normal amount.
2. The operating expenses, including taxes where taxes are paid, and excluding them where none are paid, have increased over the year 1915 abnormally—by 13% in the year 1916, 33% in the year 1917, and 52% in the year 1918.
3. The net (operating) revenues applicable to depreciation, interest, dividends and surplus, have substantially stood still since the year 1915.

The average increase in population in this country has been at the rate of approximately 1.9% compounded annually, and of the cities supplied by these 50 typical water works, about 3.1%.

†The records and diagrams will be given next week. The author's summary and conclusions are given below, however.

The net revenue of water works usually increases at the rate of from 4 to 5%* compounded annually. Yet the total increase in the three-year period from 1915 to 1918 is but 4% against a normal amount of from 12 to 15%, in spite of increases granted by the commissions.

The records and Figure 3 indicate further that the increases in rates granted to water works by the commissions seems to have amounted on the average to about 10%, serving thus to decrease the loss in net revenue in the year 1919, from 20%, more or less, to 10% or thereabouts. If this inference is sound, the loss in operation was divided equally between the works and their consumers.

It is clear, however, that the burden of increased operating expenses, plus the interest upon the new investment put into these properties during the war period, has been borne by their owners in larger measure than by the public, except in the case of publicly owned works.

It is interesting to note further that the adverse conditions in the western group of water works, do not appear to have been quite so aggravated as elsewhere in the country. This is probably accounted for by the facts that a larger relative proportion of the water served by the western, than by the eastern works—the records of which are here cited—is brought to the consumer by gravity, and that the advance in their labor costs have been relatively less, though they were at a higher point before the war.

Unskilled labor costs, in cents per hour, did not generally feel the influence of the war until the middle of the year 1916. As compared with pre-war conditions, reflected by the prices prevailing in 1915—they increased one-eighth in the year 1916, one-fourth in the year 1917, and nearly three-fourths in the year 1918. It is interesting to note further that the increase was felt most markedly in the South and upon the eastern seaboard, being nearly doubled in the first, and increased by three-fourths in the latter district. The wages paid upon the Pacific Coast before the war, which were much higher, have advanced relatively less than elsewhere, so that at the present time the eastern and western unskilled labor prices are about the same. Thus the average rate in the western group increased from 27c per hour in 1915 to 42c in 1918; while the southern rate increased from 18c to 34c; the central group from 22c to 37c, and the eastern group from 23c to 40c.

It is important to note further that even these rates are probably below current comparable rates for other labor.

Cast iron pipe prices, which had about trebled at their maximum point, have now receded to about 2 times pre-war figures.

Valves, hydrants and pumps, which had more than doubled in price, are now to be had at an advance of something over seven-eighths of pre-war prices.

Coal and fuel oil prices, which more than doubled, have receded somewhat.

Chemicals used in the purification of water, which, by reason of outstanding contracts showed an average advance of but one-third, though the market price had increased approximately three-fourths, have decreased so that the present excess cost is about one-half over pre-war prices.

FUTURE PRICES.

Engineers prefer the roll of interpreter of facts to that of prophet of the future. It is desirable, however, to note here probable future price tendencies, and it is to be hoped that there may be general discussion upon this subject, to the end that members of this society may have the benefit of comparing views, and may thus be able to plan more wisely for the future.

First: With respect to unskilled labor—While it is possible that there may be some reduction in its cost during the coming season, no marked change is to be looked for; and with respect to the rates paid to water works employes, it is believed that the prices now paid are likely to continue in most cases, and to increase rather than decrease in the remaining cases.

Unless Bolshevism runs its course in this country, or industrial depression should follow the war—neither of which seem likely—an active demand for labor is to be looked for in the near future. It is to be remembered that despite the war, the population of this country has been increasing at a rapid rate. Immigration has been at a standstill, and in the light of home demand for labor abroad, does not seem likely to be active for some time to come. Many employers, contractors and labor leaders believe that in the not distant future this country is sure to feel the competition for avilable labor, and that this will stimulate yet higher wage scales. Past experience following wars indicates that later on reaction may come, and business depression be felt for a time, but such influence is not likely to be of long duration or to affect permanently the upward tendencies.

Second; With respect to materials of construction, there is greater hope for relief. Nevertheless, no substantial reduction in the price of cast iron pipe, valves and hydrants seems likely for the present year, and but a gradual reduction is to be looked for in the future. In spite of the increased facilities for production, the labor, transportation, and money conditions involved seem likely to make themselves adversely felt for some time, and the losses resulting from the war, permanently.

Third: The materials of operation—coal, fuel oil, and chemicals—do not appear likely to decline markedly in cost, and such tendency toward decrease as there may be will probably cause the making of short-time, rather than long-time, contracts for such supplies.

Declining service. Capital has not been available for many desirable extensions during the war period. The added financial burden of such new construction as has had to be undertaken has in many cases been substantial. The increase in operating costs and taxes has been tremendous.

The structural plans of water works properties have not been maintained generally in normal condition during the war. Such has been the experience abroad, as well as in the United States. The obtaining of needed added supplies, drainage areas and water rights, the enlargement of the mechanical, pumping and boiler plants, the extension and reinforcement of supply and distribution pipe systems, and the making of normal betterments of various kinds, have been deferred, in order to conserve the country's financial resources for war purposes.

It will probably be admitted generally, by water works men, that *the war has enforced upon water works, as upon other public utilities, a declining service.*

THE FUTURE.

The conclusion to be drawn from the present physical and financial condition of water works in the United States seems clearly to be that *necessary improvements should go forward as rapidly as possible.* It is desirable to restore public confidence and further the Government's wise wish to give employment to idle labor. More important yet, *improvements are seriously needed to restore our normal high standard of water service, to adequately safeguard the public health.*

While city officials and water works men are hesitating,

*A recent analysis by the writer, of the increase in operating revenue (applicable to depreciation, interest, dividends, and surplus) in 19 different water works during the five-year pre-war period from 1910 to 1915, showed an *average rate of 4.14% compounded annually.*

the large manufacturing interests dominated by shrewd, far-sighted business men, are going ahead with their construction work, with their plant extensions and housing projects, confident that postponement will at best offset increased cost in small measure, will probably involve loss in service or profit far exceeding any saving in construction cost, and at worst will involve yet higher costs, coupled with these losses and with increasing difficulties due to a vanishing labor surplus.

The public is far more vitally interested in thoroughly good and adequate present service, than in any probable saving to be effected by delaying construction to a later date, in anticipation of further, more or less problematical decline in costs.

SAN FRANCISCO'S HIGH PRESSURE FIRE SERVICE

Formerly Maintained as a Reserve Supply, Now Used as the Main Fire-Fighting System—Difficulties of High Pressure Controlled by Use of Reducing Valve—Description of High-Pressure System.

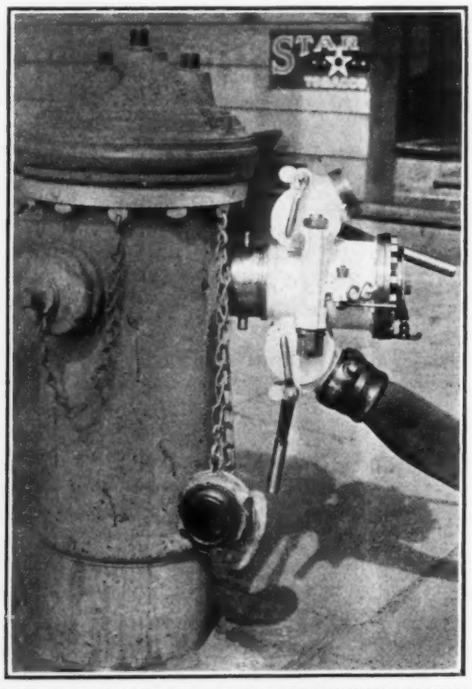
During the years succeeding the earthquake and fire, San Francisco planned and has gradually constructed a high-pressure water system for fire fighting, which has been held in reserve as an auxiliary to the regular water distribution system of the Spring Valley Water Company. Recently, however, the Fire Department has adopted this as the main fire-fighting system, the fire engines in the high-pressure zone being held as a reserve.

One reason for not using the high-pressure system regularly was the difficulty of handling the high pressures, which ran from 150 pounds to as high as 329 pounds (750 feet head). A former employe of the fire department invented, and the department has adopted, a reducing valve which can be adjusted to reduce the pressure to any lower one desired and maintain it there. It is provided with two outlets, so that, with one of these attached to each of the three 3½-inch outlets of a hydrant, six hose streams can be delivered at the desired pressure. In ordinary service, streams from the high-pressure hydrants are turned on at 120 pounds and held at this, unless orders are received to increase it; this being the pressure at which the fire engines start when drawing from low-pressure hydrants.

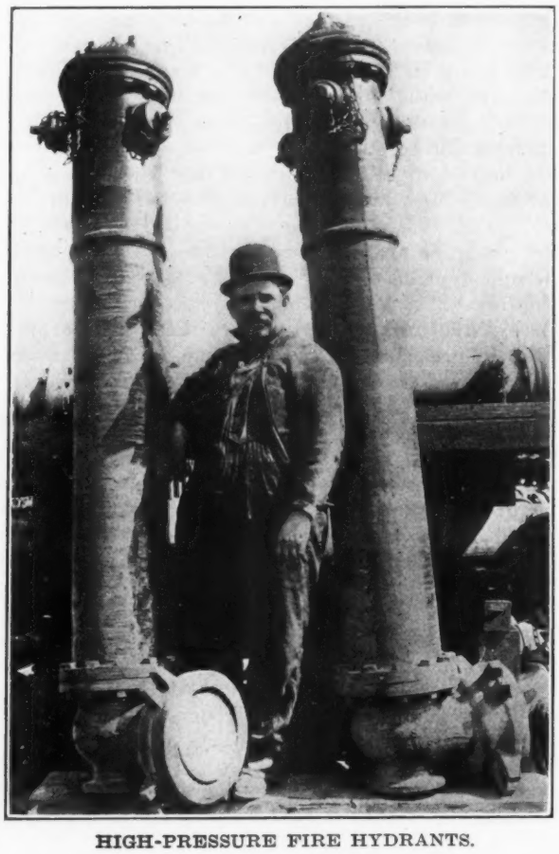
It had been planned to remove all engines from the high pressure zone, and rely entirely upon the high-pressure system. This would remove from service a thousand low-pressure hydrants in this territory for which the city paid the water company $30 a year each. But this plan met with great opposition, and even with the regular use of the high-pressure hydrants, the low-pressure ones are being retained in service.

Another reason for retaining the engines in reserve in this zone is the possibility that it will be necessary to pump from cisterns in case of breaks in the mains of both general-service and high-pressure distribution systems. There are 141 of these cisterns, always kept filled with water, their average capacity being 75,000 gallons each.

The high-pressure system cost about $5,750,000; but the insurance rates in the city have been reduced about $1,000,000 a year because of it, and this reduction is believed of itself to justify the expenditure. The saving is partly offset, however, by the cost of maintaining the system, which was $50,000 in 1917, while the interest charge was $275,000. It would seem proper to figure depreciation at not less than 5%, or $287,500. This gives



REDUCING VALVE FOR HIGH-PRESSURE HYDRANT.



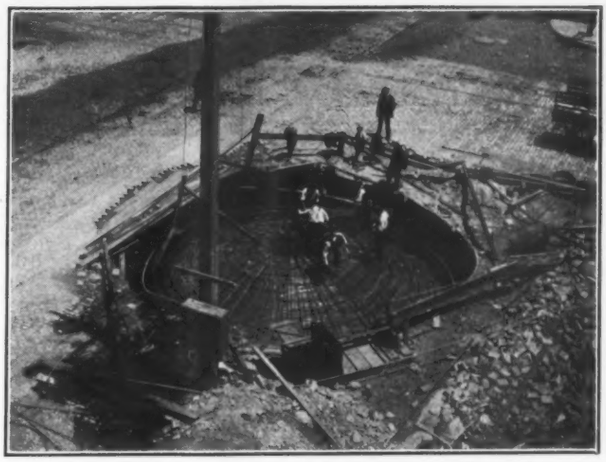
HIGH-PRESSURE FIRE HYDRANTS.

a total of $612,500 as against a saving of a million dollars. The system is being extended year by year into new sections, in each of which the insurance rates are then reduced.

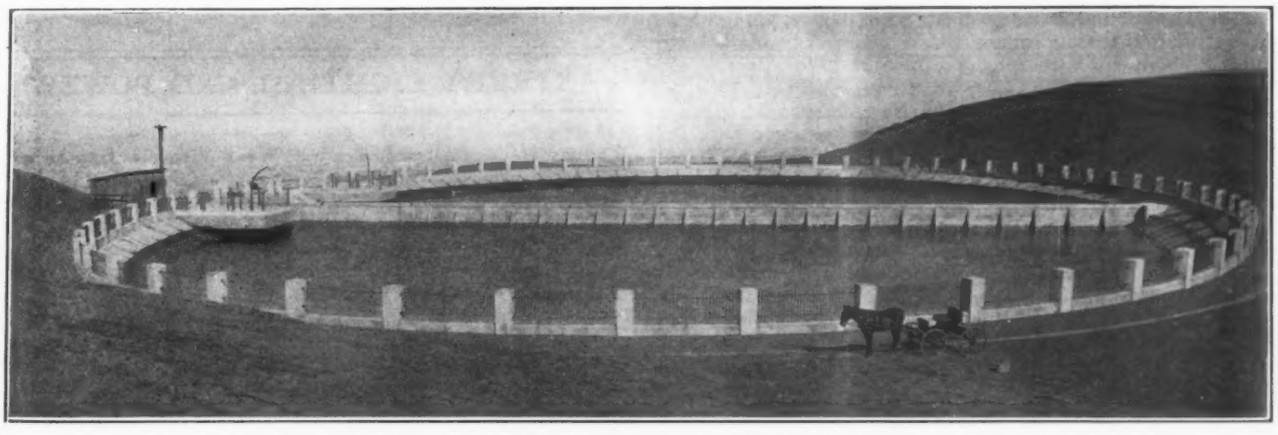
Figured in another way, the high-pressure system was used for 83 fires listed in the latest annual report; making the cost per fire about $7,400 in addition to that of the fire department. But San Francisco lost $325,000,000 in one fire, and her remembrance of this justifies her in an annual expenditure of one-fifth of one per cent of this sum.

The fire protection plan that has been carried out since the 1906 fire includes, besides the high-pressure gravity system, two pumping plants connected to this system, fire boats that can connect to and pump into it, and cisterns scattered throughout the city.

The gravity pressure is furnished by the Twin Peaks reservoir, which is about 750 feet above the corner of Second and Townsend streets, by a tank known as the Ashbury tank, about 495 feet above the same point, and by the Jones street tank, 370 feet above it. Their capacities are 10,000,000 gallons, 500,000 gallons and 750,000 gallons respectively. These are filled with water pumped from the Spring Valley mains into the Twin Peaks reservoir, the pumping plant having a capacity of 1,400 gallons a minute. The water so pumped is paid for by the city, the cost in 1917 being $7,541.



STREET CISTERN UNDER CONSTRUCTION.



TWIN PEAKS RESERVOIR. THE CITY FAINTLY VISIBLE IN THE BACKGROUND.

The Twin Peaks reservoir is oval in shape, 375 by 280 feet, and divided by a central wall of reinforced concrete, buttressed. Two 20-inch pipes serve as both inlet and outlet mains, either pipe serving either reservoir. This reservoir feeds the other two, and the pressure due to its elevation is not generally used in the lower zones (although it can be), but the pressure there is that due to the lower "tanks," about 150 or 160 pounds.

The Jones street tank is cylindrical, of reinforced concrete, 60 feet inside diameter, and 35 feet 10 inches high, artistically finished in white cement with a red tile roof to harmonize with the surroundings. The Ashbury tank is of steel, 55 feet in diameter and 29½ feet high, located 155 feet higher than the Jones street tank.

Each hydrant is plainly marked with the pressure that it is under when receiving its suplpy from either of the two tanks or from the reservoir, so that the fire company officers may know what pressure they will have to handle. Each tank supplies its own district with an average pressure of 150 pounds, but if a higher pressure is wanted, the mains can be connected with the reservoir, giving 60 pounds more in the Ashbury district, and 150 pounds more in the Jones street district.

From these tanks the high-pressure supply is distributed through 72 miles of mains from 20 inches to 10 inches diameter, and special hydrants with 8-inch hydrant connections, each supplied with a valve.

Should the reservoirs fail or their connection with the distribution system be broken, water can be supplied from the bay, by two pumping stations having a capacity of 24,000 gallons a minute under a pressure of 300 pounds. These stations and the distribution system are so interconnected that either station can serve any part of the system that remains intact. The pumping stations have stored in them 1,000,000 gallons of fresh water for boiler feed and 2,400 gallons of fuel oil—sufficient for 96 hours if cut off from outside supplies; have their own lighting plants and well-equipped kitchens.

Two fire boats, for use in case the pumping stations are put out of commission, can pump into the system 10,000 gallons of bay water a minute. They are used regularly for water front protection.

The 141 underground cisterns, provided in case the high-service system is disabled, are of reinforced concrete, most of them beneath street crossings. The average diameter is 30 feet, and capacity 75,000 gallons. No pipes for filling or emptying are rigidly connected to the cisterns, but hydrantmen attend to all cisterns in their respective districts, visiting and inspecting them once a week, keeping them filled with water by using a hose from the fire hydrant, and seeing that they are in proper condition and ready for immediate use at all times. They report the condition of the cisterns each week to the battalion chief of the district in which the cisterns are located. Water in the cisterns is kept from getting stale by the department using it in practice work.

The WEEK'S NEWS

$30,000,000 Highway Bonds for Pennsylvania—Highway Developments in New Jersey—West Virginia Gas Laws Antagonize Pennsylvania—Two Platoons for Elmira and Dallas Firemen—Four Cities Seek Managers.—New York City Wins Old Bond Issue Litigation—President Wilson Appoints Electric Railway Commission—Pittsburgh Tears Up Car Tracks in Paving Controversy.

ROADS AND PAVEMENTS

To Issue $30,000,000 Highway Bonds.

Harrisburg, Pa.—Governor Sproul has officially notified the legislature that during the next two years $30,000,000 worth of bonds will be issued for road purposes, the bonds to extend for 30 years and bear interest at 4½ per cent. The governor will issue $12,000,000 worth about July 1, 1919, and $18,000,000 about July 1, 1920.

Road Bond Issue Wins under New Law.

Waterloo, Ia.—The first bond election to be held under the new state highway law has resulted in a vote of approval in Blackhawk county. It is planned to improve 84 miles of highway with the issue of $1,500,000.

Highway Progress in New Jersey.

Trenton, N. J.—The following report has been received by Governor Edge from the state highway department relative to the resumption of the construction of highways in this state after the government's curtailment due to war conditions: "The construction program of the state highway commission for 1918, which included approximately fifty miles of new construction, and which was completely stopped last summer by federal government restrictions, is to be energetically resumed early in the spring. The highway commission now has outstanding contracts, awarded last summer, for $2,500,000 worth of work, which, with the work in the 1919 program amounting to approximately $3,000,000, provides for the completion by autumn, 1919, of nearly 1,100 miles of the new state highway system. This will be welcome news to the thousands of motorists who come to the Jersey coast and mountain resorts from all over the country during the summer, and to the industrial and commercial interests of the state having large sums invested in motor equipment. It is not generally known that the first receipts from the state highway tax levy were not available for use until February of last year, and that federal government restrictions prohibited practically all new construction during 1918, until the signing of the armistice in November, when it was too late to undertake new work."

To Use Big Shell Deposits for Highways.

Baton Rouge, La.—Commissioner M. L. Alexander, following an inspection of the big oyster shell deposits at the mouth of the Atchafalaya River, has announced that the shells, valued, approximately, at from $40,000 to $50,000, will very soon be dredged out and used for road-building purposes, concrete making, and chicken food, the beds having been leased to Alfred Mead and a contract having been entered into by him with W. D. Haden, of Galveston, Tex. A station for the distribution of the shells will be established at Morgan City, the nearest shipping point to Point au Fer, where the deposits are located. In the party which visited the deposits were: Commissioner M. L. Alexander, Duncan Buie, state highway engineer; R. V. Glenn, federal highway engineer; Thomas H. Milling, of the Board of State Affairs, and Alfred Mead, lessee. All of the party are confident that the dredging of the shells will go a long way towards solving the problem of building state highways, as the shells are used for both foundation and surfacing, and, while making good roads, are cheap, the estimated cost being $1 per cubic yard delivered at the distribution point. The oyster shell deposits were created through the freshets from the Atchafalaya River having killed the oysters. The removal of the shells will, in addition to furnishing road building material, open the channel of the mouth of the river, prevent the accumulation of back water, and make the growing of oysters in adjacent beds a more successful undertaking, relieving them of the danger of being killed by fresh water. The exploiting of the reef will bring a handsome revenue to the state, it is said. Mr. Mead has closed a contract with Contractor Haden to deliver at an early date 165,000 cubic yards of the shells, which are to be used in roadway construction in the parishes of Terrebonne and St. Mary.

STREET LIGHTING AND POWER

Pennsylvania Protests Against West Virginia Gas Laws.

Harrisburg, Pa.—Governor Sproul has signed the joint resolution of senator Crow authorizing action by the authorities of the state to prevent discrimination against the citizens of this commonwealth in the use of natural gas which would result from the law recently enacted by West Virginia. On February 17, 1919, the state of West Virginia enacted a law the effect of which is that the gas produced in that state shall be first applied to the industrial and domestic needs of home consumers before any could be transmitted into Pennsylvania. The resolution sets forth that the people of Pennsylvania have expended enormous sums of money to equip their homes and industrial plants with appliances for the burning of this fuel and to restrict the supply would affect their health, comfort and welfare. The attorney general is directed by the new law to institute such legal proceedings as are necessary to protect the rights and interests of the people of this state who have invested millions of dollars in the exploration for and the development of natural gas wells and fields in West Virginia and the transportation of gas to Pennsylvania

Vote to Extend City Plant for Commercial Service.

St. Joseph, Mo.—At the recent election, voters authorized the issue of $500,000 bonds to finance additions to the municipal electric plant. This plant for years has provided energy for city street lighting, and the plan is to extend it to furnish commercial electric service. These bonds were approved at the same time as issues for several other purposes, including a city hospital, new city hall, sewer and park improvements, etc. Advocates of the issue of $500,000 bonds for the extension of the municipal electric plant promised adequate service. The plant now existing is used to supply energy for the arc-lighting street system, and the proposed enlargement of service will mean an extensive outlay for station and distribution purposes. The local private company had trouble last winter which, it claimed, arose from failure of the city water supply. In the emergency the company had to get its water from a temporary source. This led to troubles with the boiler-feed pump and boilers. There was curtailment of the power supply for about ten days, but the company gave partial service during most of this period. To increase its facilities the company is said to be spending practically $1,000,000 this year, adding 10,000 kw. to its generating capacity.

Rate Increase Refused Because of Inadequate Service.

Osceola, Mo.—The state public service commission has been considering a complaint as to inadequate service by the Osceola Light & Water Company, and a demand by the company for an increase in rates in order to enable it to render satisfactory service. The rate increase was denied for the present, and the company was ordered to make repairs necessary to put its plant and system in proper operating condition. The commission says in part: "Both the electric and water rates are as a whole, as high as are found in most cities of this size in the State of Missouri, and since the plant appears to be operated in an inefficient manner, the defendant will be denied any increased rates at the present time, but will be required to make all necessary and needed repairs to its existing water plant, including the installation of some form of reservoir, standpipe or water tower, and to make all necessary and needed repairs to its existing electric system to enable it to give sufficient and satisfactory service."

FIRE AND POLICE

Two-Platoon System in Effect.

Elmira, N. Y.—The two-platoon system in the fire department has gone into effect, having been adopted unanimously by the police commission. The adoption of the system, which practically means the reduction of 50 per cent of the time each man is required to be on duty, is the result of long and patient effort on the part of Chief John H. Espey. One shift will work 14 hours daily while the other will work ten hours under the two-platoon system, whereas under the old schedule men have been on duty every hour of the day except on the one day a week they were allowed off. This holiday, incidentally, still will be in force. The shifts will change monthly or quarterly, according to the method considered most practicable so that the work will be equally distributed.

Two-Platoon System Improves Department.

Dallas, Tex.—The installation of the two-platoon system for the city's firemen has resulted in marked improvement in the men's attitude toward their work because of the improved working conditions. Before the double platoon system went into effect a fireman had four regular days of recreation each month and one hour three times a day. Now he is never tied up more than fourteen hours in a stretch and every other month he is on duty ten hours during the day and has from 6 o'clock in the evening until 8 o'clock the following morning for his own. New rules were adopted with the establishment of the plan. It was necessary to advance many men to fill places created by the system and to fill the vacancies with new recruits. With the installation of the double shift a system of discipline was introduced into the department which more closely resembles the military. Promptly at 8 o'clock each morning and at 6 o'clock in the evening the firemen in the sixteen houses throughout the city are called to attention by their respective commanders. Facing each other the members of the two platoons form in a single line while the roll is called. A few minutes before the hour the firemen are inspected to see that every man is in uniform and in his place. The relieving commander reports his men present or accounted for and when the signal is sounded, signs a receipt which holds him responsible for the apparatus and equipment of the station. The firemen going off duty are required to be in their places and uniform until the hour of dismissal. Exactly on the stroke of 6 and 8 o'clock a button is pressed in the central station near the Municipal Building and a gong sounds in every station in the department. This is the official signal which releases one platoon and marks the beginning of a period of duty for the other. This ceremony takes place simultaneously throughout the city and avoids the confusion attendant upon individual dismissal. From the time one platoon is released from duty until the next muster the men off watch are not required to be at the station. There is but one responsibility incumbent upon them and that is to answer all second alarms. At the present time a system has not been worked out whereby it will be possible to notify the firemen off duty when such emergencies occur, but a scheme is being planned. Some consideration is being given to a plan suggested to mount a big siren on the roof of the municipal building to give warning in case of severe conflagrations. Several other methods, such as connecting the firemen's homes by wire with the central switchboard and also arranging for telephone warning are suggested. Unmarried members of the department who desire to avail themselves of the sleeping accomodations afforded in the station houses are privileged to do so, and there are sufficient men who do this to insure the double protection. These members are not required to respond to alarms while off duty and are not called into action unless an emergency arises. Everywhere the system has met with approval. A new spirit has found its way into the entire scheme. At the cenrtal station the firemen have inaugurated a system of fines to eradicate any chance of untidy surroundings. A schedule of fines is posted on the bulletin board and every man caught throwing a cigarette end on the premises forfeits 2c. A stray match costs the unlucky man 1c, and more serious offenses are followed by heavier punishments. Similar schemes have been introduced in almost every other fire station in the city. Chief Myers is convinced that the Dallas fire department will demonstrate so ably the advantages of the new plan that many cities throughout the state will follow.

GOVERNMENT AND FINANCE

Cities Want Managers.

Gastonia, N. C.—At a recent election, the town adopted a "plan D" charter, providing for the commission-manager form of government, by a vote of 162 to 3. The new plan goes into effect at once and a manager will be appointed. The population is about 20,000.

Alliance, Neb.—This city is considering the adoption of a manager administration and has requested applications from suitable candidates. The salary will be about $3,500. Communications are being received by Ben Fallows, editor, Alliance Times.

Elizabeth City, N. C.—This city has been operating under a manager charter for about four years and is now seeking a new manager. The last one received only $1,200 a year, but the new council will pay a salary of $2,400, the maximum allowed by the charter. Applications are being received by Winfield A. Worth. The population is 10,000.

Woodstock, New Brunswick—The city is seeking a man to serve as city engineer and superintendent of public works whose powers will approximate those of a town manager. The salary will range from $2,500 to $3,000. The population is 4,500.

City Wins Old Bond Issue Suit.

New York, N. Y.—Corporation Counsel Burr has announced that the city has been successful in the suit brought by Commodore E. C. Benedict in the New York Supreme Court to hold the city responsible for $1,000,000 of certificates held by Long Island City before consolidation. The litigation arose out of the issue of certificates for the improvement of the First Ward of Long Island City under an act adopted by the Legislature in 1874. Commodore Benedict contended that, as the bonds had not been redeemed by the city treasurer of Long Island City, the city of New York, as his successor, was liable for the payment of the bonds. The certificates, it was contended, could be used in the payment of taxes levied against properties in the Long Island City section and in redeeming property sold for nonpayment of taxes. Under the statutes which authorized the issue the treasurer of Long Island City was compelled to sell the property for not less than the amount of the assessment, and when he accumulated certificates to that amount they were to be redeemed. Subsequently the law covering the sale of property for

the nonpayment of taxes was amended to permit the treasurer of Long Island City to sell at less than the amount assessed. Commodore Benedict contended that this militated to such an extent against the value of the certificates that in time they became worthless. He alleged that protests were made by his representatives at the time of the sales but were ignored by the Long Island City treasurer. About 1910 Commodore Benedict began action to impose a trust on the city of New York. It was alleged that the law permitting the sale of property for unpaid taxes was unconstitutional.

TRAFFIC AND TRANSPORTATION

Federal Commission To Investigate Street Railways.

Washington, D. C.—Following recommendations by Secretary of Commerce William C. Redfield, and Secretary of Labor William B. Wilson, President Wilson has appointed the Federal Electric Railway Commission to investigate the problems of the street railways for the country. The President appointed the following members to serve without compensation: Edwin F. Sweet, Assistant Secretary of Commerce; Royal Meeker, Commissioner of Labor Statistics, Department of Labor; Louis B. Wehle, general counsel of the War Finance Corporation, who will act during the absence in Europe of Eugene Meyer, Jr., managing director of the corporation; Charles E. Elmquist, president National Association of Railway and Utilities Commissioners; Charles W. Beall, of the American Investment Bankers' Association; Philip H. Gadsden, American Electric Railway Association; William D. Mahon, Amalgamated Association of Street and Electric Railway Employes of America, and George L. Baker, of the American Cities' League of Mayors. The new commission organized by electing Mr. Elmquist, as chairman, and Mr. Sweet, as vice chairman. The action of secretaries Redfield and Wilson were influenced by the financial difficulties of the railway companies in a number of big cities, some of which have gone to the point of bankruptcy. The recent conference of governors and mayors adopted a resolution recommending government consideration of street railway problems. The commission will have no authority to hear and determine specific controversies in any community or in respect of any company. It will attempt to determine the general principles which should govern the regulation, operation and service of electric railways. It will not interfere in any way with the regulatory functions of state regulatory bodies or municipal authorities, its functions being confined to investigation and recommendations. The election of Mr. Elmquist as chairman, is considered an indication that it is not the intention of the new commission to interfere in any way with the powers of states or municipalities. The methods by which the commission hopes to reach its conclusions have not been developed, but will be announced from time to time. Mr. Elmquist said that the commission will not start off with any preconceived notions. "It wishes to make its investigation broad and comprehensive with the view to making recommendations which will be a positive contribution to the solution of the problems which now confront the country. Those problems grow out of the expansion and improvement of service which the public properly demands; out of the great increases in the payrolls; out of the high prices for materials; out of controversies which center around financial organization and methods, and out of franchise relations." In order to explain to all the regulatory bodies the character of the general investigation contemplated, Mr. Elmquist has sent out to all commissioners a copy of the letter to President Wilson from secretaries Wilson and Redfield, with the following comment:

> The President has decided to create a commission to make a study of the general franchise and operation conditions of the electric railways in their relation to rates, including service-at-cost plans, state and municipal taxation, local paving requirements, and internal economies that may be effected.
>
> During the war, some of the utilities were in favor of having the President take over certain street and electric lines as a war measure and fix their rates, since the government was fixing the price of fuel and labor, and controlling, to a large extent, the output of the steel mills and other factories. You will recall that the war committee of our association opposed this plan, but suggested to the President, in lieu thereof, that he appoint a federal board to make a study of the utility situation and submit its recommendations to the local commissions and municipalities simply for their help and guidance in the determination of utility questions.
>
> It was felt for some time that such a board would be created, but final consideration seemed to end with the signing of the armistice. It is reported that the readjustment period has not thus far brought any relief to the utilities, and that the condition of many of them is critical. A letter from secretary Redfield and secretary Wilson was wired to the President May 15, and resulted in his determination to create a commission. I think it is in the interest of the public that the state commissioners be represented on this board, because the problem is, after all, local in its nature, and all obtainable information should be brought to the board's attention.

Mr. Elmquist has had long experience in the regluation of public utilities. From 1900 to 1908, he was county attorney of Chisago county, Rush City, Minn. He then became a member of the Minnesota Railroad and Warehouse Commission. For a number of years he was chairman of the valuation committee of the National Association of Railway and Utilities Commissioners, of which, since November, 1918, he has been president and general counsel. Mr. Sweet is assistant secretary of the Department of Commerce. He was formerly mayor of Grand Rapids, Mich., and has served a term in Congress. Louis B. Wehle, representing the Treasury Department, is counsel of the War Finance Corporation. He is a lawyer and has practiced before the Interstate Commerce Commission. During the war he served as counsel to a number of important war boards. Dr. Royal Meeker is statistician of the Department of Labor, and commissioner of the Bureau of Labor Statistics. For five years before his appointment in 1913, he was assistant professor of political economy at Princeton University. His work is widely known. His bureau recently published a 1,100-page report on employment conditions on the street railways. Mayor George L. Baker, of Portland, Ore., is chairman of the organization committee of the recently formed American Cities' League of Mayors. P. H. Gadsden is chairman of the committee on readjustment of the American Electric Railway Association, and has been in the business for over twenty years. Charles W. Beall is a member of Harris, Forbes & Co., New York, and is a financial adviser of long experience in the investment field. W. D. Mahon has been president of the Amalgamated Association of Street and Electric Railway Employes, since it was organized in 1892. He is a member of the executive committee of the National Civic Federation and of the American Federation of Labor. He has taken a leading part in a number of strikes.

City Tears up Car Tracks in Paving Fight.

Pittsburgh, Pa.—The long controversy between the city and the street car company recently became vigorous by action on the part of the city. After argument with the receivers of the Pittsburgh Railways over the street pave a gang of city workmen was sent out to remove the tracks from a section of Warrington Avenue. Within six hours an injunction to restrain the city had been granted and dissolved. The tracks were then removed. The cause of the controversy between the city and the receivers is an ordinance which has been in effect a long time, requiring the company to repave between its tracks whenever the city improves a street. Ever since the financial difficulties of the railway reached a crisis with the appointment of receivers, the city has complained of failure on the part of the company to obey this ordinance. Extensive paving improvements are under way in Warrington Avenue, and the expense to the company of its share would be about $100,000. It has been one of the contentions of the receivers, during disputes with its employes over wage matters and with the public over proposals for higher fares, that the present income and expenses of the company do not allow money even for such essential expenditures as this. The section of track the city has torn up is not in use. Cars are running on other portions of the street for which improvements are contemplated, but an agreement on division of expenses is expected to be reached before there is occasion for the city to tear up any more track.

NEWS OF THE SOCIETIES

June 23-26. — SOUTHWESTERN WATER WORKS ASSOCIATION. Annual convention, Coates House, Kansas City, Mo. Secretary, E. L. Fulkerson, 617 Washington St., Waco, Tex.

June 24-27. — AMERICAN SOCIETY FOR TESTING MATERIALS. Twenty-second annual meeting, Hotel Traymore, Atlantic City, N. J. Secretary, University of Pennsylvania.

June 24-27.—INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS. Annual convention, Kansas City, Mo. Secretary, Gen. Fire Marshal James McFall, Emergency Fleet Corporation, U. S. Shipping Board, Philadelphia, Pa.

Aug. 26-28.—LEAGUE OF CITIES OF THE THIRD CLASS IN PENNSYLVANIA. Twentieth annual convention, Allentown, Pa. Secretary, Fred H. Gates, city clerk, Wilkes-Barre, Pa.

Aug. 27-29.—VIRGINIA STATE FIREMEN'S ASSOCIATION. Thirty-third annual meeting, Charlottesville, Va. Secretary, E. K. Landis.

Oct. 27-30.—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting, New Orleans, La. Secretary, A. W. Hedrich, 169 Massachusetts ave., Boston, Mass.

Nov. 12-14.—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, Springfield, Ill.

Chamber of Commerce of the United States.

The needs of American business, as seen in the light of war experience and several months of readjustment to peace conditions, were defined by the seventh annual meeting of the Chamber of Commerce of the United States, held at St. Louis recently.

Resolutions adopted by delegates attending the meeting, who came representing every state in the union and some of the insular possessions, express a composite viewpoint of industrial leaders as to the solution of a number of questions that are before the people for settlement.

One of the most important results of the meeting was the approval by delegates attending of a recommendation by the Board of Directors that structural changes be made in the Chamber to permit an expansion of its activities and an enlargement of its usefulness. The proposed plan contemplates establishment within the Chamber of departments designed to deal especially with the following:

Industrial Production; Domestic Distribution; Foreign Commerce; Transportation and Communication; Finance; Insurance; Civic Development.

Chairmen of War Service Committees, who early in the year were formed into an advisory council of American industry, met Monday evening and voted to perpetuate the War Service Committee idea. Speakers from among members of the council declared that so much good had come from organization and operation of the committees that the movement should not be allowed to die.

The annual address of President Wheeler was delivered at Tuesday morning's session.

To facilitate the work of the meeting group sessions were held Tuesday afternoon and Wednesday afternoon. Five groups met Tuesday: Industrial Production, John W. O'Leary, Chicago, chairman; Domestic Distribution (wholesale), A. L. Shapleigh, St. Louis, chairman; Foreign Trade, George E. Smith, New York, chairman; Transportation (railroads), George A. Post, chairman; Public Utilities, Lewis E. Pierson, New York, chairman.

The Industrial Production Group heard George N. Peek, chairman of the Industrial Board of the Department of Commerce on "Price Stabilization"; Herbert E. Miles, of the Department of Labor, on "Industrial Training"; Rush C. Butler, of Chicago, and Frederick Taylor, of New York, on "Trust Legislation."

Domestic Distribution was discussed by Luther M. Walter, of council for the National Association of Owners of Railroad Securities, whose subject was "The Return of the Railroads"; M. J. Saunders, Federal Manager, Mississippi Warrior Waterways, on "Co-ordination of Rail and Inland Waterways Transportation"; C. E. Lightfoot, "Good Roads"; Murray Carleton, St. Louis, "Railroad Rates."

The Public Utilities Group heard a discussion led by Samuel W. Fordyce, Jr., of St. Louis, on "Street Railway Financing"; W. D. B. Ainey, chairman of the Public Service Commission of Pennsylvania, on "The Street Railway Problem as an Operative One," and Festus J. Wade, of St. Louis, on "The Effect on Community Values of Impairment or Suspension of Electric Railway Service."

Under the chairmanship of John W. O'Leary, the Industrial Production Group heard John T. Stone, president of the Maryland Casualty Company, of Baltimore, on "Workmen's Compensation and State Insurance"; Ernest T. Trigg, president of the National Federation of Construction Industries, on "The Building Industry"; and Paul M. Warburg of New York, on "Taxation and Loans."

On Wednesday the Public Utilities Group held an open hearing with a large number of persons joining in the discussion. Highways and waterways formed two groups with E. J. Mehren, editor of the Engineering News-Record, leading discussion on highways and Walter S. Dickey and Thomas F. Cunningham, of New Orleans, speaking on waterways.

Three viewpoints on the railroad problem were presented at a general session Wednesday evening by Walker D. Hines, Director General of Railroads; Senator Albert B. Cummins, and Samuel Rea, president of the Pennsylvania Railroad.

A meeting of the National Association of Commercial Organization Secretaries was held Thursday also. Speakers were J. M. Guild, of Kansas City, president of the National Association of Commercial Organization Secretaries, "The Chamber of Commerce in the Readjustment Period"; Robert H. Manley, of Omaha, and N. B. Kelly, of Philadelphia, "Chambers of Commerce as Employment Bureaus for Returned Soldiers"; William S. Millener, of Williamsport, Pa., and S. B. Price, of Bridgeport, Conn., "Housing Problems"; I. W. Schmidt, of Detroit, and W. F. McNeill, of Chicago, "Americanization Work"; N. P. Neighbor, of Altoona, Pa., and Howard Strong, of Rochester, "The New Relationship of Labor."

Among the resolutions passed were the following:

Government and Business.

The very essence of civilization is that there be placed upon the individual only that degree of restraint which shall prevent his encroachment upon the rights of others, thus releasing to the utmost individual initiative in every proper direction.

Our form of government most effectively expresses and maintains this principle. Within our basic law exists ample provision for such changes as may from time to time be necessary to safeguard our people. It is, therefore, essential that our government should scrupulously refrain from entering any of the fields of transportation, communication, industry, and commerce, or any phase of business when it can be successfully undertaken and conducted by private enterprise. Any tendency of government to enter such fields should be carefully weighed in the light of its possible effect upon the very genius of our institutions.

Construction.

The interests of the public require an immediate resumption of construction activities in order that the housing and other construction needs of the nation necessarily deferred by the war may be provided and that labor may find ample employment.

The Federal Government, especially the Railroad Administration and the Treasury Department, as well as state, county and municipal authorities, should proceed with public work wherever possible.

Street and interurban railways have such a fundamental place in all important communities, and conditions of war have disclosed such acute situations in the affairs of this class of public utilities, that the chamber's Committee on Public Utilities should proceed with its hearings and studies to the end that it may soon place before the board of directors a report with recommendations respecting the procedure which should be followed to place these important facilities upon a basis which will assure their efficient service.

Highways.

That highways are an integral part of our nation's system of transportation has been emphasized by the war, and an enormous development is at hand, so important as to require a comprehensive national policy, under which federal appropriations for highways will be applied to national needs for interstate commerce, agriculture, postal delivery, common defense and general welfare.

Congress should create a federal highway commission, independent of present departments of the government, composed of members from the different geographical sections of the country, to perform all executive functions of the federal government pertaining to highways including those relating to existing appropriations in aid of state construction. Such a commission should act in coordination with any federal agency that may have functions of ar-

(*Continued on page 461.*)

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

STERLING GASOLINE MOTORS.

For Driving Centrifugal Pumps and Electric Generators.

The Sterling engines, manufactured by the Sterling Engine Company, have long been known in the marine field. The records made by the motors have led to the redesigning and adaptation of the engines for stationary work, and there are numerous units installed as standby plants for fire protection; driving centrifugal pumps, and generators. The motors are adapted to this service as they develop their rated power at a speed most desirable for the work.

Enclosure of all moving parts of the models FC and EC is a feature, and there is unusual provision for accessibility. All covers are easily removed and attached, and ample space is provided in which to make adjustments if required. The engines are smooth running and quiet, as vibration has been practically eliminated. Longevity is assured through the extensive use of drop forgings for crankshaft, camshaft and connecting rods, and for bearing caps, crankshaft and camshaft gears, in addition to which bronze and aluminum castings of great tensile strength are specified throughout the motors, the material being the best procurable. Accurate dimensions are adhered to so that parts ordered in replacement will always fit properly.

The design of models FC and EC 17-25 H.P. motors incorporates a hollow crankshaft force feed lubricating system, oil being pumped to all main and connecting rod bearings through the crankshaft, considered the most advanced and efficient system in use today. An oil sight gauge and an oil pressure gauge are provided, so that one has a constant check on the oiling system.

The equipment of electric starter and electric generator, with battery, assures power to meet any emergency. This power is constant, as the motors may be depended upon to run satisfactorily for long periods at maximum r.p.m. under full load.

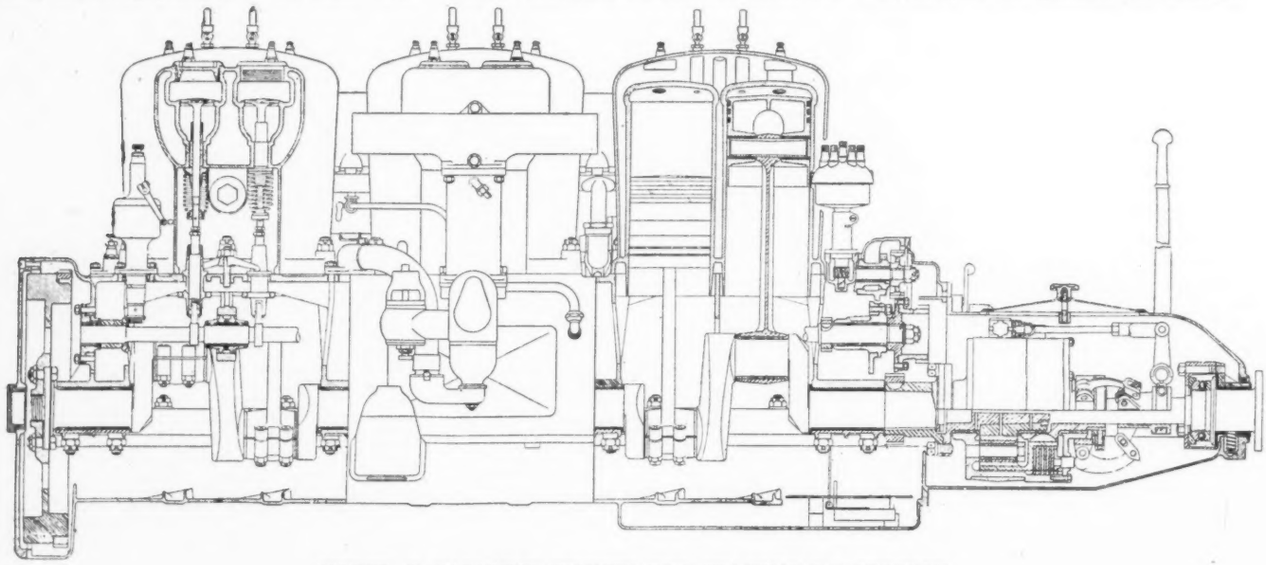
The Sterling line of stationary engines include the following:

Model.	Cylinders.	Bore. In.	Stroke. In.	R. P. M.	H. P.	Base.
FC*	4	5½	6¾	800-1200-1400	55- 85-100	Iron
FC*	6	5½	6¾	800-1200-1400	85-125-145	Iron
FC*	8	5½	6¾	800-1200-1400	115-170-200	Iron lower; bronze upper
FC*	8	6¾	9	800-1000	240-300	Iron lower; bronze upper
DC-12	2	5½	7	400- 500	12- 15	Iron
EC 17-25†	4	3⅝	5½	600-1000-1200	17- 25- 30	Aluminum

*Regular equipment includes electric starter and generator (two units).
†Reguar equipment includes electric starter-generator (single unit).

Model FC motors, having T head cylinders, are regularly designed to turn anti-clockwise facing the flywheel end, but can be furnished for clockwise rotation if desired. The drive is taken from the crankshaft which projects from the after end of the motor, and which is machined for mounting a flexible coupling. The models EC and DC moters, being of the L head type, are built to turn anti-clockwise only. The construction of the base allows a simple foundation. Where a radiator is used an air cooled exhaust manifold with an expansion joint between each cylinder casting is provided; however, a water jacketed exhaust manifold creates less heat, and is a protection for the operator, this type of manifold being installed where a supply of water is available.

These engines are adapted to various types of installations in waterworks and small electric plants. For instance, a number of sets are used by the Navy Department consisting of a model E, 10 h.p. Sterling direct connected to a 2 k.w. a.c. generator and a 1¼ k.w. d.c. generator. The d.c. can be used for charging storage batteries and for other purposes. This set is designed to operate at 1500 r.p.m. and is held accurately at that speed by a centrifugal governor. It is, however, adapted to any use within its capacity, if connected to a suitable generator. The engine could easily carry a 5 k.w. generator, operating at 1100 or 1200 r.p.m. If used in connection with a storage battery, much more power could be supplied intermittently for either lighting or power purposes. It is also suitable for conditions where it is desirable to move the source of power frequently, in which case the set can be carried and operated on a truck. Another combination in use by the Navy is a model FC, 4-cylinder Sterling engine developing 85 h.p. at 1200 r.p.m., direct connected to a 3-stage centrifugal fire pump with a capacity of 500 gallons per minute.



MODEL F GASOLINE ENGINE FOR STATIONARY SERVICE.

INDUSTRIAL NEWS

The Asphalt Association Organized.

Representatives of the principal asphalt producing companies of the United States and Canada have completed the organization of an association, the title of which is to be **"The Asphalt Association."** Its purpose will be to disseminate information concerning the uses of asphalt, with particular reference to highway construction and street paving. It will cooperate with city, county and municipal officials and with scientific bodies and colleges seeking to encourage the most effective methods in the use of this material.

The officers elected for the coming year are: President, J. R. Draney; vice-president, W. W. MacFarland; treasurer, N. G. M. Luykx. The secretary, who will be the active officer in charge of the affairs of the association, is J. E. Pennybacker, formerly chief of management of the U. S. Bureau of Public Roads, and during the war period secretary of the U. S. Highways Council. The New York office will be located at 15 Maiden Lane. Other offices will be established soon at Chicago and Atlanta, and ultimately in Canada and other cities in the United States.

The officers of the new association are widely known in the industry, and their participation in the organization is assurance of recognized standing and effective work. Mr. Draney is the general sales manager of the U. S. Asphalt Refining Co., and of the Bitoslag Paving Co.; Mr. MacFarland is vice-president of the Warner-Quinlan Asphalt Co., and Mr. Luykx is assistant to the president of the Freeport & Mexican Oil Corporation.

The need of such an organization has been felt by Mr. Draney for a number of years, and many months of work were required to shape developments. That it has finally been formed is due to the broad-minded interest, earnest vision and untiring efforts of Mr. Draney.

Southern Asphalt Association.

The Southern Asphalt Association, including the principal public-works contractors engaged in laying asphalt pavement in South Atlantic states, has opened offices in Atlanta, in the Healey Building.

The association will be conducted in the interest of the construction of asphalt roads and pavements in the South Atlantic states. The purpose is to create a wider and better knowledge among public officials and tax-payers of the utility and advantages of asphalt for road and street purposes. This is to be accomplished by a general publicity campaign. In addition, the association will endeavor to keep experienced and skilled workmen steadily employed by putting them in touch with the members of the association who have need for their services.

The following officers have been elected: President, Walter Ely, of the Ely Construction Co., Augusta, Ga., and vice-president, W. R. Mayrant, general manager of the Simmons-Mayrant Co., Charleston, S. C. J. M. Woodruff, who resigned recently as manager of the advertising and paving department of the Standard Asphalt & Refining Co., of Chicago, is general manager. Mr. Woodruff, who has a wide and favorable acquaintance in the asphalt and paving industries in the central and southern states and a broad experience in the field, has also been connected with the Standard Asphalt & Rubber Co., Chicago, as manager of publicity and paving departments and with Warren Brothers Co., Boston, as southern representative.

Warning Against Impostor.

The Thomson Meter Co., 100 Bridge street, Brooklyn, N. Y., has issued a warning that an impostor is traveling through the New England States; and perhaps elsewhere, representing himself as the relative of a former officer of the company, and as being well acquainted with the present officials and representatives. His story is that he has lost his money and is desirous of returning to New York, and he asks for a loan to pay hotel bills, railroad fare, etc. The company asks that anyone approached by this man notify it or Mr. E. Shedd, 266 Brookline ave., Boston, Mass., by wire.

The Barber Asphalt Paving Co., Philadelphia, Pa., announces that following the promotion of Charles W. Bayliss, formerly manager of the street and road department, to vice-president in charge of sales, the following changes in organization became effective June 1, 1919: J. E. Morris, manager, street and road department, Philadelphia, Pa.; H. M. Stafford will succeed J. E. Morris, as assistant manager, in charge of the eastern district, with headquarters at Philadelphia; F. F. Massey is promoted to succeed Mr. Stafford as assistant manager, in charge of the southwestern district, with headquarters at Memphis, Tenn.; C. R. March is promoted to succeed Mr. T. H. Morris, as sales manager of the Iroquois department.

NEWS OF THE SOCIETIES

(Continued from page 459.)

ticulating rail, trolley, water and highway transportation.

Congress should make substantial appropriations for the construction and maintenance of a national highway system to serve the need for the maintenance of interstate travel and traffic.

The commission should report to Congress a plan for continued aid for state construction of highways in the period beyond 1921, to which time the provisions of existing federal-aid laws extend.

Expenditures of funds should be permitted only for highways which are of a permanent type, having thorough drainage, substantial foundations, sufficient width, and a capacity for traffic which will be reasonably adequate for future needs.

Waterways.

While the utilization of natural resources, the development of industries and extension of commerce depends upon adequate transportation, existing facilities are inadequate to meet the increasing needs of the nation.

We urge that the Government speedily complete river improvement projects already authorized, and that Congress provide for a comprehensive system of waterways with co-ordination of the services of waterways and railways.

Adequate terminals are essential to waterways for the economic exchange of traffic.

We recommend to the directors of the chamber the appointment of a special committee to study these questions and to invoke national legislation, where necessary, for the accomplishment of the above purposes.

Water Powers.

True conservation of the waterpower resources of the United States in the acceleration of its industrial and commercial progress awaits the enactment of appropriate legislation. After a referendum to the membership, this chamber has announced the principles which it advocates in such legislation. Legislation very largely in accordance with these principles was practically agreed upon by the last Congress. The new Congress is urged to enact such legislation in the early days of its forthcoming session.

National Budget.

A national budget will introduce standards of business in co-relating income and outgo and afford information as to the disposition and sources of public funds. Expenditures of the federal government have reached sums beyond all earlier contemplation. Taxation and borrowing have assumed proportions hitherto unknown. Through referendum and by vote of delegates in annual meeting this chamber has repeatedly advocated a budget system as a means of introducing business methods in the government's fiscal affairs. We affirm these declarations.

The budget system should be accompanied by a central governmental agency which will be permanent and properly equipped for proposing standardization, simplification, and increased efficiency in government offices. For this purpose Congress should authorize, and the President appoint, a commission to which the President may look for suggestion of improvements in the administrative organization and methods of the government.

American Institute of Electrical Engineers.

At the annual business meeting of the American Institute of Electrical Engineers, held in New York, May 16, the following officers were declared elected for the year beginning August 1, 1919: president, Calvert Townley, New York; vice presidents, Charles E. Skinner, Pittsburgh; John B. Fisken, Spokane; N. A. Carle, Newark; L. R. Jorgensen, San Francisco; Wills Maclachlan, Toronto; A. M. Schoen, Atlanta; managers, L. E. Imlay, Niagara Falls; L. F. Morehouse, New York; F. F. Fowle, Chicago; treasurer, Geo. A. Hamilton, Elizabeth, N. J. (re-elected).

The above, together with the following hold-over officers, will constitute the board of directors for the next administrative year: C. A. Adams, Cambridge; W. A. Del Mar, New York; G. Faccioli, Pittsfield; W. A. Hall, Lynn; E. H. Martindale, Cleveland; F. D. Newbury, Pittsburgh; E. W. Rice, Jr., Schenectady; Charles Robbins, Pittsburgh; Charles F. Ruffner, St. Louis; W. I. Slichter, New York; Wilfred Sykes, Pittsburgh.

At the meeting of the board of directors held on the same date F. L. Hutchinson was re-elected secretary of the Institute for the coming administrative year.

THE MUNICIPAL INDEX

(Continued from last week's issue)

Comparison of Truck Rates and Freight Rates on Short Hauls. Truck rates on short hauls out of New York much less than railway rates for corresponding distances, according to figures compiled by W. J. L. Bauham, traffic mgr., Otis Elevator Co., and printed in Commercial Vehicle. 700 words. Engineering and Contracting, May 7. 15 cts.

Keeping Truck Costs. Truck owners and manufacturers have perfected what they call the "national standard truck cost system," and already 18,000 trucks are being kept by this system. 300 words. Municipal Journal and Public Works, May 3. 10 cts.

The Highways Transport Committee. Outline of its past work and future policy in promoting motor truck transportation. By John S. Cravens, Council of Nat. Defense. Address at Nat. Ass'n of Motor Truck Sales Mgrs. at Philadelphia. 1,000 words. Good Roads, May 3. 10 cts.

A Motor Truck Is Only as Efficient as Its Body. Equipment must be adapted to particular conditions; accessory equipment that facilitates motor truck operation. 2,000 words. Engineering and Contracting, May 21. 15 cts.

Motor Equipment of United States Army Engineer Corps. Motor truck adapted to many purposes; portable carpenter, machine, blacksmith and printing shops and search-lights. 9 ills., 1,300 words. Engineering News-Record, May 29. 20 cts.

Miscellaneous:

Transportation Surveys for Rural Motor Express Routes. Influenced by two general factors, (a) volume of business or tonnage, and (b) those surrounding conditions which have a direct bearing on the business. By J. A. Collins, investigator of market surveys, Bureau of Markets, U. S. Dept. of Agriculture. Paper before National Highway Traffic Ass'n. 1,800 words. Good Roads, May 17. 10 cts.

Wanted: Rural Motor Express in the State of New York. New transportation need in New York State. From paper at meeting of National Highway Traffic Ass'n by James E. Boyle, extension professor of rural economy, College of Agriculture, Cornell University. 1,800 words. Good Roads, May 17. 10 cts.

Traffic Engineers for Highway Departments. A. A. A. official points out need for experts on traffic and transportation, as well as construction and maintenance. 500 words. Good Roads, May 3. 10 cts.

Car Body Maintenance in Belfast. Original improvements which have been made to prolong the life and strengthen the structure of double-deck cars. By P. Williamson, car works supt., Belfast city tramways. 2 ills., 2,200 words. Electric Railway Journal, May 31. 15 cts.

Six Years of Rapid Transit Progress in New York. Construction enterprise greater than Panama Canal carried on at remarkable rate despite war interference; over four times as much work accomplished as on old subway. By D. L. Turner, chief engr., public service commission for first dist., N. Y. C. 6 ills., 2,700 words. Engineering News-Record, May 1. 20 cts.

MISCELLANEOUS.

Miami Flood Control Works. Plans form important chapter in investigations made by the engineering staff of the Miami Conservancy District. 200 words. Municipal Journal and Public Works, May 10. 10 cts.

New Classification Proposed for Rock to Be Excavated. Geologist bases grading rules on ease of excavation and true geological composition. 1,200 words. Engineering News-Record, May 8. 20 cts.

Progressive Erosion in a Dredged Drainage Channel. Observations on enlargement and effect on capacity, together with computations of value of n in Kutter's formula. By C. E. Ramser, senior drainage engr., Office of Public Roads & Rural Engrg., U. S. Dept. of Agriculture, Washington, D. C. 4 ills., 1,100 words. Engineering News-Record, May 1. 20 cts.

A Review of Modern Steam Shovel Practice, with Recommended Procedure. Capacity doubled in two decades; fixed or rotating bodies; dipper and boom operation. Reprinted from Canadian Engineer. By Capt. Llewellyn N. Edwards, supervising engr. of bridges, Toronto. 3 ills., 4,000 words. Municipal and County Engineering, May. 25 cts.

Methods and Costs of Stump Removal in Land Clearing. Dynamite in stump removal; methods of loading and firing; capstan pullers. 3 ills., 3,000 words. Engineering and Contracting, May 21. 15 cts.

Inspection of Drainage Ditch Cross-Sections After Contract Dredging. Soundings first made by level rod gave way to lead and line following along tape; boat used by sounding man was pulled across by means of tape. By E. S. Blaine, engr., Little River Drainage Dist., Kennett, Mo. 7 ills., 3,500 words. Engineering News-Record, May 22. 20 cts.

Cost Accounting as Applied to Sand and Stone Production. Purpose is to show that the accounting department of present-day sand and gravel business can be made as valuable an essential to the business as the producing or selling departments. By Tom P. McGrath, McGrath Land and Gravel Co., Lincoln, Ill. 800 words. Engineering and Contracting, May 21. 15 cts.

Accounting as Applied to the General Contractor. Wide difference in method or rather lack of method in accounting partially responsible for the feeling of distrust in the mind of bankers and bondsmen toward contractors. By L. A. Weatherwax, of Hendrickson & Co., Inc., Seattle, Wash. 1,500 words. Engineering and Contracting, May 21. 15 cts.

What the American Army Engineers Did in the War. Part of an official report made by Benedict Crowell, ass't secretary of war and director of munitions, tells in detail the extent of America's participation in the mechanics of the war; road building under enemy fire. 2,000 words. Engineering News-Record, May 15. 20 cts.

Low Labor Output in War Work Not Due to Cost-Plus Contract. Interviews with contractors prominent in war work indicate low efficiency of labor resulted from long hours and excessive demand. Editorial Interview. 1,200 words. Engineering News-Record, May 8. 20 cts.

Cost-Plus Contract Incentive to Close Management. Contractor creates a clientele of customers and not merely a chance to bid again, says prominent cost-plus advocate. Editorial Interview. 1,000 words. Engineering News-Record, May 1. 20 cts.

National Department of Public Works. In a meeting of the Western Society of Engineers under the auspices of the Engineering Council the project to form a department of public works with a cabinet officer at its head met with unanimous approval. 2,500 words. Engineering World, May 1. 15 cts.

Engineering Societies Organize to Push Public Works Department Bill. 74 societies represented at conference in Chicago; principles adopted with reference to character of proposed department. 7,000 words. Engineering News-Record, May 1. 20 cts.

Proposed Schedule of Engineers' Salaries. For all grades, from chief or city engineer to inspector, on the various kinds of public work. 1,000 words. Municipal Journal and Public Works, May 31. 10 cts.

To Promote Interests of Public Engineers. To be the chief beneficiaries of the labors of the American Association of Engineers during the next year; editorial suggestions. 1,400 words. Municipal and County Engineering, May. 25 cts.

The Engineering Alliance. Some future developments in engineering as seen from a highway standpoint. Abstract of paper before N. Y. Chapter, American Society of Civil Engineers, by H. E. Breed, consulting engr., N. Y. 3,800 words. Engineering World, May 15. 15 cts.

The Engineer in Politics. Engineering societies have too often held themselves aloof from political subjects; political activity beneficial to the association. By W. A. Stinchcomb, county engr. of Cuyohoga Co., Ohio. Paper before American Ass'n of Engineers. 1,600 words. Municipal Journal and Public Works, May 31. 10 cts.

The Engineer as a Citizen. Essential to civilization; should study legislation and administration; morale important; responsibility in civic life; his relation to public opinion; eliminate expensive system of competition in production and distribution. Papers by P. N. Moore, Calvert Townley, N. P. Lewis, Spencer Miller, C. A. Adams before the Metropolitan District Engineers, N. Y. C. "Mechanical Engineering." 4,000 words. Canadian Engineer, May 22. 15 cts.

Some Present Problems of Public Utilities. Portion of address delivered before the Illinois Gas Ass'n by a public utility man qualified to speak with authority. By Samuel Insull, Chicago, Ill. 1,700 words. Gas Age, May 1. 20 cts.

Problem of Financing Public Utility Companies. Public more interested in utility stocks than is generally realized; maintenance of credit; other factors. By C. Corey, vice-pres., Harris Trust and Savings Bank, Chicago. 1,000 words. Electrical Review, May 17. 30 cts.

Public Ownership of Public Utilities. Editorial referring to article in this issue by one who has for over 20 years managed one of the most successful municipal plants in the country. 300 words. Municipal Journal and Public Works, May 24. 10 cts.

Ownership or Control of Utilities. Advantages of each discussed by one who has had 22 years' experience as head of a municipal plant. 1,000 words. Municipal Journal and Public Works, May 24. 10 cts.

Municipal Bonds. April, 1918, a record for recent years and April, 1919, has been surpassed by only three Aprils. 100 words. Municipal Journal and Public Works, May 10.

Educating the Taxpayers. Editorial referring to Detroit's experimental filtration plant. 200 words. Municipal Journal and Public Works, May 10. 10 cts.

Prices During the War and the Readjustment Period. Rise in this country not so great as in others; great increase in currency; prices during and after the Civil War; a new price level established. Abstract of paper before the N. Y. Chapter of the American Institute of Architects by T. S. Holden, investigator, Economic Section, Div. of Public Works and Construction Developments, U. S. Dept. of Labor. 2 ills., 2,800 words. Engineering and Contracting, May 28. 15 cts.

Prices Yesterday, Today and Tomorrow. An address before the editorial conference at the N. Y. Business Publishers Ass'n by O. P. Austin, statistician of the Nat. City Bank of N. Y. C. 4,000 words. Gas Age, May 1. 20 cts. Engineering and Contracting, May 14. 15 cts.

Neurasthenia a Growing Disease in Engineering Work. May be caused by accident, overwork, grinding routine or outside worries; expert care imperative. By C. C. Sherlock, Des Moines, Ia. 700 words. Engineering News-Record, May 8. 20 cts.

Reorganization of the Engineering Standards Committee. Effect of engineering standards movement on technical societies; reorganization to give broader representation; association may be formed to elect the committee; formulating safety codes. By Edward B. Rosa, chief physicist, Bureau of Standards, Washington, D. C. 2,100 words. Engineering News Record, May 1. 2,700 words. Engineering News-Record, May 8. 20 cts.

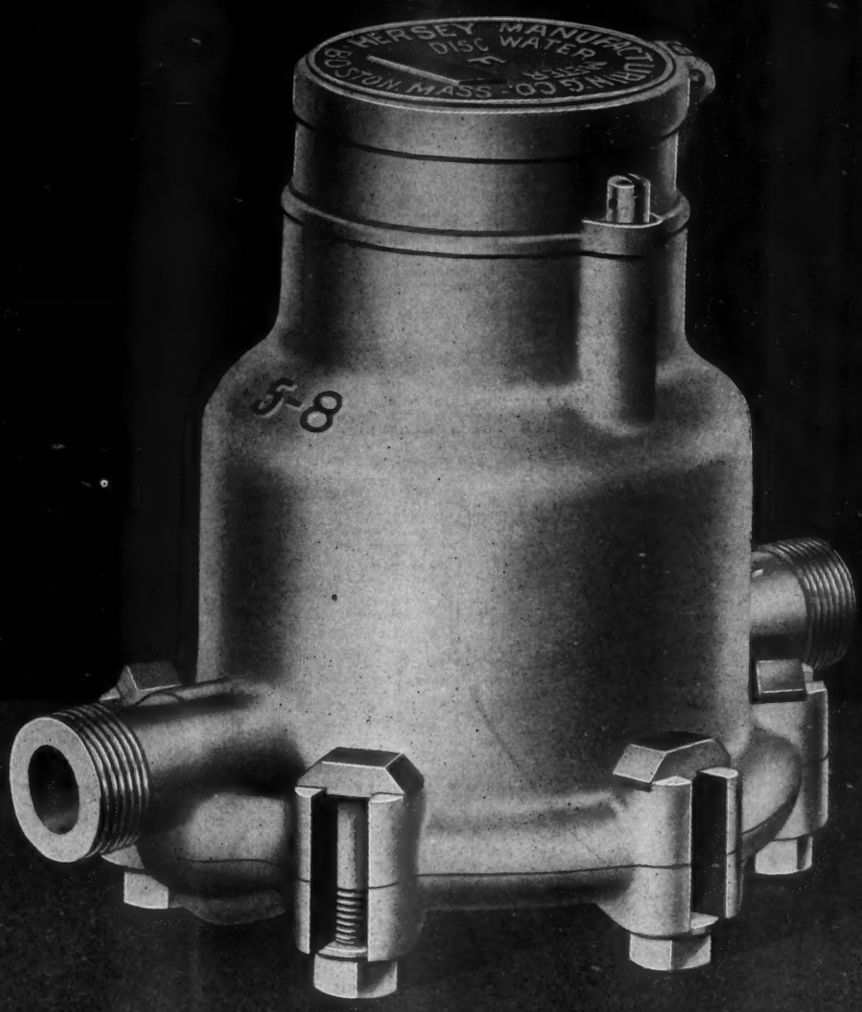
Present Status of Photographic Mapping from the Air. Airplane mapping possible and practicable, but two great problems, horizontalization of camera and effects of surface relief, must be solved. By J. B. Mertie, Jr., Associate Geologist, U. S. Geological Survey, Washington, D. C. 4,500 words. Engineering News-Record, May 22. 20 cts.

Methods Used in Aero-Photographic Mapping. Outgrowth of experience in use of panoramic camera in Alaska; application to problems of airplane photography; theory of transforming camera. By F. H. Moffit in "Geographical Review." 9 ills., 4,500 words. Engineering News-Record, May 22. 20 cts.

How the Problem of Filing Drawings Vertically Has Been Solved. Brief description and illustration of vertical file devised by C. B. Ulrich and made by the Ulrich Planfiling Equipment Co., Jamestown, N. Y. 1 ill., 600 words. Engineering and Contracting, May 21. 15 cts.

A Map-Indexing System Adapted to Small Cities. Number book, with simple classification scheme combined with four-color card index, used at Riverside, Cal. By F. J. Calkins, Riverside. 1 ill., 1,000 words. Engineering News-Record, May 15. 20 cts.

City Recording System for Real Estate Titles. Excellent system devised for New Castle, Pa., by City Engineer C. H. Milholland. 1 ill., 500 words. Engineering and Contracting, May 7. 15 cts.



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